VIRGINIA WILDLIFE

OCTOBER, 1956

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Commission Photo by Kesteloo

October fishing is exceptional in Tidewater Virginia.

VIRGINIA WILDLIFE

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A Monthly Magazine Dedicated to the Conservation, Restoration, and Wise Use of Virginia's Wildlife and Related Natural Resources, and to the Betterment of Hunting and Fishing in Virginia

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Cover

This raccoon family seems disturbed by an encounter with a snapping turtle. Ed Bierly's beautiful painting captures the tenseness and excitement of the moment.

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OCTOBER'S MAGIC

OCTOBER is crisp and mellow in the Old Dominion —somewhat like aging cider. There is a nippy warning of frost on the night air. The autumn moon is big, casting a soft yellow glow over the new-fallen leaves. Wild things are busy with the fall harvest, preparing for the cold, bleak days that winter will soon bring. It is a time for gathering and storing. All activity in nature seems somewhat hurried; the tempo of living has quickened. This is the time to be out of doors observing nature at her very best. The fawn has shed his spotted coat. June-hatched grouse are strong of wing. The wild bees buzz madly about the late-flowering plants, storing the life-sustaining nectar in their hexagonal cupboards.

The chattering chipmunk is preoccupied collecting every acorn or hickory nut within his reach, securing his booty in a hollow stump storehouse. I sometimes think that chipmunks must all have food left over when early spring breezes arouse them from their winter's slumber.

Mr. Woodchuck, fat and slick of coat, gleans the late-growing green clover. He is girding himself for the long winter hibernation deep below the frost line in his evenly heated chambers.

Wild geese winging down from more northern climates stop and partake of the abundant fall harvest. Their clarion call can be heard throughout the land.

Yes, October is a month of magic, of preparation and changes. Nature's face is constantly changing. That helps make her more intriguing. She is always active, never static, for living things either grow or die. There is no standing still in the out of doors. Winter will retard and bring its dormancy but the surging spark of life is just asleep, resting until there is enough warmth and sunlight to stimulate an active flow of energy through the veins of plants and animals alike, as they shake off the drowsiness of a long winter's nap. Trees have changed their green summer dresses and slipped into something with a more colorful hue of yellows, reds, or browns. The larva of a butterfly cradled in its soft silky cocoon rocks gently on the wind-stirred branch in an alder thicket. With the coming of spring, the miracle of metamorphosis will release the showy monarch butterfly to help brighten a fresh new world.

Who knows what permeates the brain of wild things. The scientists tell us they have no sense of reasoning, yet how strong their natural instincts. Sometimes man, with all of his so-called knowledge and power to make decisions, could learn from the seemingly blind inner "know how" of creatures that live by the fang and claw. But man, with his busy ways, is too often unconscious of nature and her happenings. Ofttimes, as the old saw goes, he sees the forest but recognizes not a single tree.

Autumn's October changes fill the treasure house of nature and sometimes it seems to me that the storehouse must overflow and spill the bountiful harvest. There is so much going on out of doors, so little time to see.

The spider webs, woven between the strands of wire on the pasture fences, sparkle like spangled jewels in the rays of the rising sun. Old timers say you can predict the number of frosts of the approaching winter by counting the mornings when the dew collects heavily on these webs. I have never tested the method because the tale is too intriguing to stand the acid test of cold scientific probing.

The magic of October pulsates around the points of the compass. Hardly a living thing is left untouched. We have only to open our eyes and see the startling wonders of nature interwoven into the very branches of every tree. For within a single leaf simple food is being manufactured. With the aid of sunlight and a strange green substance—chlorophyll—basic materials of minerals, carbon dioxide and water are transformed into food. Here the very spark of life is generated by a secret natural process called photosynthesis. Through this process the radiant energy of the sun is transformed into chemical energy, so essential for stimulating all other vital activities in the plant and animal world. Strange indeed, but man on the brink of the atomic age, master and splitter of the atom, has never been able to duplicate this chemistry of nature.

"Jack Frost" waves his magician's wand over the countryside and from twilight until dawn conjures some "strong magic" that even the most indifferent will notice with a start when "old sol" lifts his sleepy head above the eastern horizon. The green of summer has disappeared and in its place the colors of autumn shine like Inca gold. Winter's reign, close at hand, is announced with majesty by the splendor of these fall hues. *Every* season brings imposing changes in nature's pageantry, but surely *October* is a month of magic.—W. C. K.

MAN IN A CHANGING WORLD

The machine has divorced man from the world of nature to which he belongs, and in the process he has lost in large measure the powers of contemplation with which he was endowed. . . .The flower and vegetable garden, green grass, the fireplace, the primeval forest with its wondrous assemblage of living things, the uninhabited hilltop where one can silently look at the stars and wonder—all of these things and many others are necessary for the fulfillment of man's psychological and spiritual needs. To be sure, they are of no "practical value" and are seemingly unrelated to man's pressing need for food and living space. But they are as necessary to the preservation of humanism as food is necessary tothe preservation of human life.—*Harrison Brown,* in "The Challenge of Man's Future."

S. C. S. Photo

The genius of man, aided by a scientific knowledge of farming and good soil conservation practices, has enabled farmers to grow two blades of grass where one grew before.

Democracy At Work In My Soil Conservation District

By PAUL SANDERS
Editor, Southern Planter

"IN THE BEGINNING God created the Heavens and the Earth." Man was placed on earth to enjoy and develop it, thus he was left as caretaker of the soil. Except for air and water, all of the material necessities of life are products of the soil. Man himself is a living product of the soil. Our great cities with all of their complex activities and our great industries in the manufacturing of all of their products are dependent upon the fruitfulness and abundance of our soil and water resources. The genius of man, aided by a scientific knowledge of farming, has enabled him to cooperate constructively with nature, planting the soil with higher yielding varieties, cultivating the soil with more efficient equipment and fertilizing it with more nutritive plant foods and thus being able to grow two blades of grass where one grew before.

And yet, the same machinery that enabled some men to increase their yields has enabled others to destroy these gifts of God. The carelessness of man coupled with the destructive forces of nature has caused erosion which has left tragic wounds on our farmlands. Not only do these destructive forces leave wounds on our farmlands but they leave wounds on a nation of people.

Courtesy of *Garden Gossip*.

Let us not forget that we, the farmers of America, must continue to produce the food and fibre for America—the best fed and best clothed nation on earth, but we must do more that that—we must continue feeding the mouths of hungry millions of our foreign friends in order to help prevent the spread of communist aggression. There are no longer new frontiers to which we can go and find new soils—we must conserve the soils we have and utilize them within their capabilities. Therefore, an organized effort in combating erosion on county, district, state and national levels is a necessity. This is the role of the Soil Conservation District in the "American Agricultural Story."

Our government is formed on the principle that we—each and every one of us—all of us together—have the ability, intelligence, and spirit to decide for ourselves the action we should take in our joint interest and our common welfare. Soil Conservation Districts are governed on a great principle—the principle of democracy—the principle on which America was founded—the principle that free men can successfully govern themselves. This is the form, the spirit, and the practice of Soil Conservation Districts. This democratic principle of districts is first reflected in the manner in which they are

formed. To illustrate this I shall trace for you the formation of my district.

Realizing the necessity of soil and water conservation on our Virginia farms, the General Assembly in 1938 passed the Virginia Soil Conservation Districts Act making possible the creation of Soil Conservaton Districts. Whether or not a district was formed was left entirely to the landowners. The law gave small and large an equal opportunity in making this decision. The law also stated that the responsibility for formulating and carrying out this erosion control program was to be placed on the shoulders of the landowners within the district. Our district was formed under this democratic piece of legislation in January of the following year when:

(1) Groups of interested and public spirited farmers signed petitions expressing their desire for a Soil Conservation District and addressed this petition to the State Soil Conservation Committee.

(2) Upon the receipt of these petitions, hearings were held by the State Soil Conservation Committee to determine the scope and interest for a district.

(3) Based upon the results of these hearings, the boundaries of the district were established and a referendum was conducted within the proposed area to permit the landowners to decide on the question of forming a district.

(4) Over two-thirds of our votes were favorable, and the Thomas Jefferson Soil Conservation District became a reality and a political subdivision of the state.

The district embraces Albemarle, Louisa, Goochland, Fluvanna, and Nelson Counties in the Piedmont of central Virginia. It contains 1,500,000 acres and extends from the top of the Blue Ridge Mountains in the west to the tidewater belt in the east.

We named our district for Thomas Jefferson, a lover of the soil, a pioneer American soil conservationist, a great believer in the democratic ideals of government who in 1811 wrote, "No occupation is so delightful to me as the culture of the earth." He demonstrated well his concern for the soil of his farm at Monticello, by constant experimentations and the use of crop rotations, terraces, reduction of intertilled crops, and contouring of which he often spoke as "horizontal plowing."

I am proud to be a member and a part of the Thomas Jefferson Soil Conservation District because I believe that we, in our district, are putting into effect those ideals of democracy in which Jefferson believed, and we are applying the soil conservation practices and proper land use which he so strongly advocated. We are doing other things too of which Jefferson would be proud and of which we are justly proud. We are making our farming more profitable, our living more abundant and our lives more wholesome—because of our cooperative efforts.

We, the landowners and operators who organized the district some 14 years ago, direct the affairs of the district. The government of the Thomas Jefferson Conservation District is American self-government.

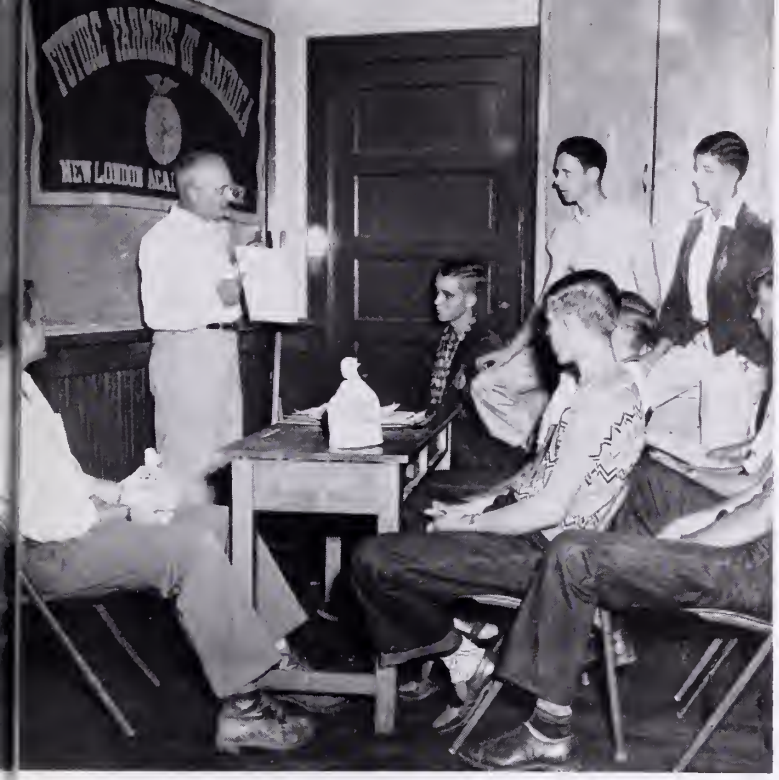
The affairs of our Soil Conservation District are managed by five local citizens called supervisors. Two of the supervisors are appointed by the State Soil Conservation Committee whereas the remaining three are elected by the popular vote of citizens in the district. They are Mr. John S. Farrar, Mr. John Whitehead, Mr. E. L. Bradley, Jr., Mr. Charles Wilson and Mr. R. J. Fisher. These men receive no financial reward for their services as supervisors, but they receive that wonderful satisfaction which comes to one with a job well done. This is a board of unselfish men—devoting themselves, their time, effort and wisdom to directing a program of soil and water conservation, looking forward to the day when each of the farms in the district will have a complete soil and water conservation plan.

Soil Conservation Service technicians map out land for the best use of each acre to accomplish the most desirable sustained production.

The first official act of our board of supervisors was to appoint and call together committees of farmers who were acquainted with local conditions. Aided by the advice and assistance of our county agents and other agricultural experts, the various committees formulated the district's program and plan of work suited to the conditions within our district. This program and plan of work represented ideas of the people living within our district.

The district program sets forth the needs of the district based on the proper use of the land.

The work plan of the district sets forth the methods and procedures which will be followed in carrying out the district program. In the preparation of the work plan, we considered the available facilities on our farms, our implements, labor, machinery, financial means, and the interest and will of the farmer to try new methods. We know that to be most effective, these recommendation practices must fit both the economic means of the farmer and needs of the land. Therefore, we the people of the Thomas Jefferson Soil Conservation District not only organized our district but we developed and put into effect our own plan of operation for the district.



Commission Photo by Kesteloo

The Soil Conservation District has served as a means by which all of the agricultural agencies and others have pooled their efforts to get a job done.

This is "democracy at work."

We are solving our land problems in our district in accordance with the principle outlined by the well known Abraham Lincoln who said, "You cannot help one permanently by doing for him that which he could and should do for himself." Districts have recognized that it is first necessary to acquaint landowners and all others with the problems of improper land use and then to show them the advantages of doing something about these problems. Landowners need help in solving many problems which they cannot successfully solve without assistance. Districts are supplying this aid.

The Soil Conservation District secures from the Soil Conservation Service, soils technicians who map our land showing the slope, degree of erosion, present land use and other important physical features. Using this inventory, the farmer and the conservation farm planner work out together the best use of each acre and determine how each field, pasture and woodlot should be treated and managed to conserve the land and at the same time accomplish the most desirable sustained production.

The conditions as shown by the land inventory, what the farmer agrees to do about these conditions—and what help the district will supply (including technical help) are written down in what is known as a conservation farm plan. Each individual farm plan includes an aerial photographic map of the land involved and another map which shows what conservation practices the farmer intends to apply to the land. When these plans go into effect, your land, my land, the farm lands of our America will be as secure against erosion as conservationists and farmers know how to make them.

We, the farmers of my community, are bound together with a common bond of interest. Our soils are similar in fertility, slope drainage needs, texture, structure and type. We realize that individual land problems soon become community problems. Farm fences, property lines or state lines do not stop erosion or floods. We must cooperate with our neighbors in the solution of these problems.

Floods in our communities have resulted from the accumulation of run-off from all of our farms that drain into the James River. Since the organization of the Thomas Jefferson Soil Conservation District, flood prevention measures have been taken on the watersheds, catching the water where it falls. We have applied contour strip cropping, improved our pastures, reforested our cut-over timber lands and applied many other necessary and important conservation measures to our land on community and watershed bases. We have constructed in our district some 700 farm ponds with a water capacity of 3 billion gallons. These ponds have been built on the small streams and branches back in the mountain hollows storing the water on the watersheds and providing the farmer with recreation, fire protection, water for livestock, and irrigation. This is a part of good conservation farming! By utilizing these small ponds we are lowering the excess water in an orderly manner to the larger streams.

The Soil Conservation District has served as a means by which all of the agricultural agencies, many private organizations, and individuals have pooled their efforts to get a job done which affects the welfare of us all.

I only wish that time permitted me to tell you how much the banks have helped us, how the schools have cooperated with the district, how the various state and federal agencies have combined their efforts in this one conservation program. Civic clubs, garden clubs, women's clubs, and a countless number of other organizations have contributed to the success of the program of the Thomas Jefferson District. Our district supervisors have not only recognized that soil and water conservation is everybody's business, but they have through good leadership gained the support of the people of the district in developing this program of sound land use and soil and water conservation. This is "democracy at work in soil conservation districts."

Productive land is essential to the well-being of any nation and to the people who live in that nation. We cannot keep our nation strong, progressive, and productive on eroded soils.

The soil is calling and those of us who hear this call and respect our liberties must answer it. We must not, we cannot, we dare not exploit our soils for short time gains, for once the fertile spongy topsoils have washed from our American farm lands our freedom and future security are left in jeopardy.

As loyal Americans we must do all that we can to protect and conserve this God given heritage and we must do everything in our power to preserve and defend our American way of life against those who seek to destroy it.

For I remind you that the conservation of our land and the preservation of our liberty are two inseparable responsibilities. To protect the one is to defend the other.

THE MODERN BOWHUNTER OF VIRGINIA

By BILL COCHRAN
Virginia Bowhunter's Association

WHEN the Indians laid down their bows and arrows in preference to firearms, it looked as though bowhunting would become a lost art. But through the efforts of a few men, a reformation took place. Since this fairly recent rebirth, men, women, boys and girls by the thousands have learned to use the bow and arrow. They have practiced in their back yards, joined clubs, and shot in matches in order to improve their chances of a successful hunt. The romantic background of the bow and the lure of the outdoors has turned this age old weapon of survival into one of the fastest growing sports of today.

Why do so many hunters wish to hunt under the distinct handicap of a bow and arrow? Most any bowhunter would be quick and willing to give you the answer. He is a true sportsman, and nothing is more thrilling to him than evenly pitting his skill and physical strength against that of a wild animal. He also enjoys the early season, uncrowded hunting conditions, and hunting safety that bowhunting offers. He likes the quietness of his bow, and to watch his arrow quietly soar above the ground toward its mark will give him an unforgettable thrill. A close miss with a bow and arrow is often more satisfying than a hit with a high powered rifle.

The modern bowhunter has far superior equipment to that of the American Indian, who hunted the same woods years before him. The accurate, hard hitting, modern bows of fiberglass, metal, or split bamboo, together with straight arrows equipped with steel points and brightly painted shafts would make any Indian of yesteryear the idol of his tribe. If only the modern bowhunter knew woodsmanship and the way of the wild like the Indian, he would be a much more successful hunter.

Virginia is adding to the advancement of bowhunting by offering a special ten day deer and bear bowhunting season before the regular gun season, and a special deer hunt at Hog Island Game Refuge, exclusive for bowhunting. Along with these special seasons the Virginia bowhunter can hunt during the regular gun season. This gives him ample time to test his bowhunting skill.

If you hunt entirely for meat and not the thrill of the chase or satisfaction of being in the outdoors, bowhunting is not for you. A bowhunter is not a meat hunter. Although he is just as anxious to get game, and has a weapon capable of downing it for him, he is giving the hunted a more sporting chance; therefore his game is less, but his thrills are greater when he connects. No matter what the game bag holds, the bowhunter will always find pleasure, recreation, thrills, and close communion with nature and its wildlife.

This year and the years ahead promise an even greater number of bowhunters. Bowhunting in Virginia has been built on a foundation of sportsmanship and the bowhunter has been a symbol of a true sportsman. Let's keep it that way.

AN INVESTMENT IN AMERICA

By RICHARD H. POUGH*

MANY a successful American wonders if there is not some way in which he can invest in the future of the land that has been so generous to him. Is there anything he can do that will benefit and strengthen the nation and pay dividends in health and human happiness for centuries to come? To those who recognize the critical nature of the period through which our country is now passing, the answer is yes—by helping local communities obtain control of their remaining natural recreation areas and choice wildlife habitats. There is no question but that the farsighted philanthropist who does this will be revered by coming generations and achieve as much immortality as any man can hope for.

Land set aside for outdoor recreation and the noble task of preserving samples of the earth's wild creatures becomes increasingly precious with every passing year. It cannot wear out. It cannot depreciate—and nature makes no charge for its maintenance. Its benefits extend to all. The more sensitive the individual, the greater the degree of benefit. Throughout history many of our finest minds and greatest leaders—men who have carried the torch for our civilization—have felt a compelling need for occasional escape from the tensions of life.

America has been traditionally a land of wide open spaces. A land where a man, without fear of trespassing, could get away from the sights and sounds of urban life. Few realize how rapidly this situation is changing as our population mounts million by million. Our growing appetite for goods and services, coupled with an increased ability to exploit land, is leaving fewer and fewer areas in their natural state. Our present wild parks, wilderness preserves and wildlife refuges, large and small, represent only a fraction of the land that we should have in these categories if we are to provide adequately for the recreational and spiritual needs of our future population.

The day is not far off when only areas that have been reserved for these purposes will possess wilderness qualities or provide a suitable habitat for the perpetuation of the shyer forms of wildlife. Today we are setting land use patterns for countless generations, as yet unborn. Those who help to influence these patterns to the end that bits of wild nature can still be part of the heritage of every American are performing an incalculable service to the nation.

*Mr. Richard H. Pough is treasurer of Wildlife Preserves, Inc.

Photo by H. S. Mosby

The protection of the adult wild turkey hen is the key to the production of more gangs of turkeys.

Are We Killing the Hens With the Golden Eggs?

By C. H. SHAFFER

Leader, Farm Game Program

SEVERAL years ago two sportsmen were turkey hunting in one of the counties in Piedmont Virginia. After locating and following some fresh scratching for several miles, their dogs finally flushed a nice gang of seven young turkeys. The excitement and anticipation of bagging a wild turkey gradually increased as two locations were selected and the blinds were carefully constructed. It was decided that one of the hunters would occupy the ridge blind and do the calling, while his older companion would remain in a cedar lap directly below at the foot of the ridge. After the dogs had been returned to the car and a hasty lunch was consumed, the hunters excitedly returned to their respective blinds.

The cold was penetrating that afternoon and it wasn't long before both hunters were shivering and shaking from the cold and excitement. The hunter on the ridge had "yelped" only three times at ten minute intervals when he first heard a turkey answer. It was still some distance away, but was coming and appeared to be in a perfect position for his companion to eventually get a shot. The caller and the turkey continued their little game of "turkey talk" and every time the turkey answered it moved closer to the cedar lap where the other sportsman was concealed. From his vantage point on the ridge, the caller saw the turkey approaching the blind, yelping and clucking softly until it was barely six feet from the cedar lap.

Expecting a shot every second, the caller frantically wondered why his buddy hadn't already killed the turkey. Had his gun jammed? Did he have an attack of

"buck fever," or possibly a heart attack from the excitement? Perhaps he had gotten too cold and returned to the car. All these thoughts and many more ran through the mind of the turkey caller while the turkey remained in the bottom walking back and forth, calling for its companions. After what seemed to be a good half hour, the turkey flew up in the pine directly over the blind and called several more times . . . still there was no shot. Finally it sailed out of the pine down toward the river. The hunt was over!

The caller rushed down the ridge to the cedar blind, fearing to find something drastically wrong with his friend. Instead he found him only blue and shivering from the excitement and the weather.

"Why in the hades didn't you kill that turkey?" demanded the caller. "You had a thousand opportunities! It must have stayed by your blind and over your head in that pine for a good three quarters of an hour. What happened to you? Why didn't you shoot?"

The kindly conservationist's rebuttle was so typical of him (but so rare for the average hunter) that it should be preserved for posterity. "Son, that was a small hen turkey and I couldn't force myself to shoot her," he answered sadly. "After all, she and the others of her sex are the ones we depend on to lay the eggs and raise gangs of turkeys for us each year. If I had killed her all I would have now would be a dead turkey, and she and her potential broods would be lost forever. Now if it had been a big gobbler, naturally I would have shot, but a hen . . . never. Turkey hunting is too great a sport for me to destroy. If hunters throughout the state continue shooting hens as they have been, someday there may not be any more wonderful turkey hunting for anyone. Would you want to see that happen?"

Sportsmen and conservationists of the state of Virginia, would you want this to happen?

Numerous conservationists are very much concerned about the present plight, as well as the future, of the most noble and largest of Virginia's game birds. Despite the Game Commission's efforts to restock and protect the turkeys, their numbers in many counties have reached a dangerously low level. In still other localities they already have been extirpated. During the past hunting season turkey hunting was prohibited in 38 Virginia counties due to the scarcity of turkey flocks.

In searching for explanations for this rather dreary picture on the decline of the wild turkey in Virginia, it has been found that the reasons are many, varied, and complicated. Unfortunately, many of the decimating factors for the wild turkey cannot be eliminated under the present-day economy. The turkey is primarily a deep woods bird requiring large tracts of mast-producing trees in their range. They, unlike deer and some other wildlife species, can rarely adapt themselves to conditions as they exist today in many sections of Virginia. The great demand for forest products has caused the cutting of many large tracts of excellent wild turkey range. Increased need for pine pulpwood has resulted in the elimination of hardwoods through such practices as girdling and bulldozing, to encourage the growth of pines. Our greatly expanding human populations, along with their highways, power saws, and bulldozers, have invaded deeper and deeper into former large tracts of timber. Growing human populations have intensified the dog problems and greatly increased hunting pressure on the turkeys.

Modern clean farming with mechanized equipment has resulted in increased losses of turkey nests. In addition to all the other factors, there is concrete evidence that poultry diseases have invaded some of the turkey flocks in their former native ranges. Still another most disturbing factor has recently been discovered . . . the breeding potential of the wild turkey hen is seldom attained, and the average productivity of the adult turkey hens throughout Virginia is unbelievably low.

The turkey picture at times looks so dark that a number of realistic sportsmen predict that in a number of

(Continued on page 20)

One of the greatest thrills in turkey hunting is being able to call a turkey close enough to identify it as a gobbler.

Commission Photos

In most cases the old tom can be distinguished from the hen turkey by the hair-like beard hanging from the breast.

Chemical Controls in Relation to Wildlife*

DR. CLARENCE COTTAM,
Director
Rob and Bessie Welder Wildlife Foundation

(PART ONE)

Commission Photo by Kesteloo

Chemicals useful in controlling pests of man belong in the category of mixed blessings. They can do great good if used wisely, or do great damage to wildlife if used without discrimination.

IN THIS fast moving world, the change in materials and procedures for the control of pests are about as amazing as the forward strides in aviation. The efficiency of modern chemical control is as far superior to the old method of pinching squash bugs by hand as the speed of the modern jet aircraft is to the slow-moving horse-drawn buggy of a few decades ago.

In recent years, man has turned to powerful new poisons in his continuing struggle against insects, bacteria, fungi, weeds, rodents, and predators. Control agents and formulations are legion, and new products appear almost weekly. The 1955 edition of the Pesticide Handbook[1] lists 6204 commercial preparations of present-day poisons for controlling pests. Many other new chemical compounds are concocted and tested, but only a relatively few that show promise after screening appear on the market. Each year an estimated 400 to 500 million pounds of basic pesticides valued at 200 million dollars are used in this country. Mixed with dusts, solvents, and other carriers, this totals about three billion pounds of formulated pesticides for which the consumer pays between 400-500 million dollars annually.

Generally, each step forward in economic and social progress involves a step backward for certain values. The modern automobile, which adds so much to our convenience, comfort, and speed of travel, blots out the lives of thousands of our citizens annually. In addition, autos kills hundreds of thousands of rabbits, deer, pheasants, quail and other game and non-game each year. While such losses are regrettable, they are not sufficient to induce a return to the less destructive horse and buggy. Nor is the public so impressed with the heavy penalties paid for settlement and agricultural development of the West that the land is likely to be restored to its original occupants—the Indians and the bison.

Chemicals useful in controlling pests of man belong in this category of mixed blessings.[2] Like the automobile, airplane, or atomic power, they clearly manifest potentialities for great good as well as harm, depending upon our skill and wisdom in using them. Their economic value is so great that there can be no doubt that pesticides are here to stay, even though more effective, economically successful, and, it is hoped, more selective control agents replace or supplement those now in use. Anyone who has grown tomatoes, corn, beans, or a rose bush in his small garden plot is aware of the importance of insecticides. City dwellers as well as farmers realize how essential chemical controls are against everyday pests such as aphids, Japanese beetles, corn-borers, cutworms, codling moths, grasshoppers, ants, mosquitoes, and house flies. Usually, however, little regard is given by the average citizen to less favorable aspects of pesticide uses.

The Need for Research

By recognition of our past mistakes, we may be able to avoid similar ones in the future. Losses resulting from chemical controls have been largely unnecessary. They are mostly the result of carelessness or, more commonly, the lack of sufficient knowledge and sound judgment in use of these pesticides. More information or know-how is the primary need if we expect to assure effective pro-

*Grateful acknowledgment is made for the critical review and technical help given by Paul F. Springer and Dr. A. C. Martin of the Patuxent Research Refuge.

tection of wildlife values while reaping the benefits of chemical controls.

Funds for the development of new control agents are almost unlimited, but unfortunately there is comparatively little financial support for testing effects of these materials upon wildlife and its habitat. A number of states and federal agencies have contributed what they could to this work, but it represents only a fraction of the need. The "miracle" control compounds are increasing so rapidly that reliable know-how for avoidance of harm to wildlife, and even human life, has not kept pace. The urgent need is for information on formulations, dosages, methods, and time of application most likely to prevent or minimize damage to wildlife. Experience shows that where control workers and wildlife biologists have cooperated, effective control has resulted, with damage held to a minimum.

The present dilemma of unbalance between extensive operational control and limited research on effects of pesticides cannot be properly blamed upon pest-ridden farmers or other users. Neither should the manufacturers be unduly criticized for meeting popular demands. In fact, blaming any person, agency or firm is not likely to solve the problem. The important thing is to expedite as much as possible the development of needed knowledge for effective and safe use of these new tools. Public support for research is needed, and public and private agencies should exert every effort to undertake the necessary research. We know almost nothing of even the direct effects of many control agents on plants, animals, soils and soil organisms, and we know still less of the indirect, accumulative and long-time effects these controls have upon wildlife, plants and even upon man.

Value of Wildlife Resources

Hunting and fishing comprise an important part of the American way of life. During 1955 14.2 million persons bought hunting licenses, and another 18.8 million purchased fishing permits. Many complimentary licenses were also issued. Probably another 8 million or more, who were not required to buy licenses, participated in these all-American sports. Furthermore, the public demand for sport fishing and hunting is increasing by leaps and bounds, and it is likely to continue growing as long as an adequate game supply and a place to obtain the resources are maintained. Waterfowl hunting alone has increased five-fold in the United States in the past 17 years.

It has been estimated that, directly or indirectly in the pursuit of their favored sport, fishermen and hunters spend not less than 8 billion dollars annually![3] The food value of the game harvested probably is worth from one-half to one billion dollars. In addition, commercial fish harvests amount to about four billion 400 million pounds, and is worth about 350 million dollars before processing. Even in this age of astronomically high finance, this is Big Business! Yet, much of the benefit cannot be measured in dollars and cents. In our opinion the health, recreational, aesthetic, and spiritual values of wildlife to the American public will equal and probably exceed the direct economic or monetary values. We must not let this recreational resource be impaired by unwise use of chemical controls.

The New Insecticides

Most new insecticides can be placed in two general categories: (1) chlorinated hydrocarbons including DDT, TDE or DDD, methoxychlor, chlordane, heptachlor, benzene hexachloride, lindane, toxaphene, aldrin, dieldrin, and endrin; (2) organic phosphates among which are parathion, TEPP, EPN, malathion, chlorthion, dizainon, dipterex, and demeton. These new chemicals differ from those formerly used in that most of them are both internal and external poisons. Many, particularly the chlorinated hydrocarbons, have residual properties

(Continued on page 22)

Damage often occurs in agricultural areas when insecticides wash from fields heavily treated with chemicals into streams and ponds, killing fish and aquatic life.

Commission Photos

Laboratory studies have shown that sub-lethal amounts of certain insecticides may be stored in body fat, causing poisoning when fat reserves are utilized.

OPEN HUNTING SEASONS AND BAG LIMITS

When open date for any species of game bird or game animals falls on Sunday, hunting will not be permitted until following day.

Quail*, Rabbits, Grouse, Turkeys, Pheasants***:**
West of Blue Ridge and on National Forest ..... November 19-January 10
East of Blue Ridge ..... November 19-January 20
*No open season on quail on Gwynn's Island in Mathews County.

****Turkeys**—CLOSING DATES exceptions:
Alleghany, Augusta, Bath, Botetourt, Frederick, Highland, Page, Rockbridge, Rockingham, Shenandoah, and that section of Amherst and Nelson Counties lying within the National Forest area ..... December 15

Unlawful to hunt turkeys in Bland, Buchanan, Carroll, Charles City, Clarke, Craig, Dickenson, Floyd, Franklin, Giles, Gloucester, Grayson, Greene, Henry, King George, Lancaster, Lee, Loudoun, Madison, Mathews, Montgomery, Middlesex, Norfolk, Northumberland, Patrick, Pittsylvania, Pulaski, Rappahannock, Richmond, Roanoke, Russell, Scott, Tazewell, Smyth, Warren, Washington, Westmoreland, Wise and Wythe Counties.

*****PHEASANTS**—Unlawful to hunt in Madison County.

Bag Limits—Quail, 8 a day, 125 a season; Rabbits, hunt and/or trap, 6 a day, 75 a season; Grouse, 3 a day, 15 a season; Turkey, 1 a day, 2 a season; Pheasant, 4 a day, 20 a season.

Exceptions—Turkey: bag limits in Alleghany, Augusta, Bath, Botetourt, Fauquier, Frederick, Highland, James City, New Kent, Page, Rockbridge, Rockingham, Shenandoah, and that section of Amherst and Nelson Counties lying within National Forest area, 1 a day, 1 a season.

DEER

Lawful to kill **male deer** with antlers visible above the hair in any county of this State where there is an open season.

OPEN SEASONS:

Gun and/or bow and arrow
East of Blue Ridge ..... November 19-January 5
West of Blue Ridge ..... November 19-24
BOW AND ARROW only, (in counties where there is a general open season). 1 a day, 1 a season, either sex ..... November 1-10
In that section of **AMHERST** County west of Route No. 29 and in that section of **NELSON** County west of Route No. 151 deer may be hunted only (without use of dogs) ..... November 19-24

Exceptions—PRINCESS ANNE, NORFOLK and in that section of **NANSEMOND** County lying east of a line as follows: beginning at a point on State highway number ten where it intersects the Isle of Wight county line thence along such highway to its intersection with the corporate limits of the city of Suffolk; thence easterly, southerly and westerly with such corporate limits to their intersection with State highway number thirty-two; thence along such highway to its intersection with State highway number thirty-seven; thence along State highway number thirty-seven to the North Carolina line ..... October 1-November 30

ISLE OF WIGHT and in that portion of **NANSEMOND** County to the west of the line established in the foregoing paragraph ..... November 10-January 5

In **ACCOMACK** County it shall be unlawful to hunt deer on Mondays, Wednesdays, Thursdays and Fridays during the open season for taking the same, these being declared rest days, however, this shall not apply to Parramore Island.

Unlawful to hunt deer with dogs west of the Blue Ridge and in those sections of **NELSON** County lying west of Rt. #151, and in **AMHERST** County lying west of Rt. #29.

Unlawful to hunt deer in the following counties: Arlington, Bedford, Bland east of highways No. 21 and No. 52, Buchanan, Dickenson, Fairfax, Floyd, Franklin, Giles in that section west of New River, Henry, Loudoun, Montgomery, Northampton, Patrick, Pittsylvania, Prince William, Pulaski in that section north of New River, Russell except in that section lying on the southside along north of Clinch Mountain bounded on the east by U. S. Highway No. 19 from the Washington County line going north to Moccasin Creek Road No. 676 following this number west to where it intersects No. 679, following No. 679 west to where it intersects No. 613, following No. 613 to Scott County line during the open season for hunting deer west of the Blue Ridge Mountains and Wythe County north of Highway No. 11.

BAG LIMITS:

The lawful bag limits on deer shall be as follows:

One buck deer a season—Statewide, **EXCEPT** in Amelia, Chesterfield, Dinwiddie, Greensville, Halifax, and Powhatan one buck a day, two a season.

Accomack one buck a season **EXCEPT** on Parramore Island one deer, either a buck or doe.

Alleghany, Augusta, Botetourt, Carroll, Clarke, Craig, Giles (except that section west of New River), Grayson, Roanoke, Rockbridge, Washington in that area south of Highway #11 only, and Wythe in that section south of Highway #11 only, either sex may be taken on the last day of the open season.

Bath, Frederick, Highland, Page, Rockingham, Shenandoah, Warren and Smythe in that section south of Highway #11 only, either sex may be taken on the last **two** days of the open season.

On Naval Mine Depot, the Cheatham Annex, Camp Peary and Fort Eustis properties either sex may be taken, one a day, two a season.

In Caroline, Essex, James City, King and Queen, King William, Warwick City and York one a day, two a season, one of which may be a doe.

In Isle of Wight, Nansemond, Norfolk, Prince George, Princess Anne, Southampton, Surry and Sussex one a day, two a season, one of which may be a doe during the last **five** days of the season.

In Charles City and New Kent Counties one a day, two a season, one of which may be a doe during the last **two** days of open season.

Lawful to hunt bear and deer either sex with bow and arrow November 1-10, except where there is a closed general hunting season on either or both species.

ELK

Bedford County only without use of dogs ..... November 19-24
Bag limit—1 bull a season with antlers above the hair.

BEAR

OPEN SEASONS:

Gun and/or bow and arrow
Statewide ..... November 19-January 5
Bow and arrow only in counties where there is a general open season ..... November 1-10

EXCEPTIONS: Bland, Giles, Grayson, Montgomery, Pulaski, Smyth, Tazewell, Washington and Wythe ..... November 5-January 5

Hunting bear west of the Blue Ridge Mountains in counties having an open season for hunting deer is prohibited from November 5-10 and November 19-24 inclusive, except in the counties of Bland, Giles, Grayson, Montgomery, Pulaski, Smyth, Tazewell, Washington and Wythe bear may be hunted without the aid of dogs during these periods.

Princess Anne, Norfolk and that portion of Nansemond County lying east of a line as follows: beginning at a point on State highway number ten where it intersects the Isle of Wight County line, thence along such highway to its intersection with the corporate limits of the city of Suffolk; thence easterly, southerly, and westerly with such corporate limits to their intersection with State highway number thirty-two; thence along such highway number to its intersection with State highway number thirty-seven; thence along State highway number thirty-seven to the North Carolina line ..... October 1-November 30
Isle of Wight and in that portion of Nansemond County to the west of the line established in the foregoing paragraph ..... November 10-January 5
To trap, Statewide ..... November 15-December 31

Bag Limit—One bear a season (trap and/or hunt).
Legal bear not less than 75 pounds live weight.

RABBITS

OPEN SEASON—To Trap ..... November 15-January 31
Bag Limit—6 a day, 75 a season, hunt and/or trap.

SQUIRRELS

OPEN SEASON:

East of Blue Ridge ..... November 19-January 20
West of Blue Ridge and National Forest areas ..... November 19-January 10

EXCEPTIONS: Accomack, Amherst, Bedford, Culpeper, Fairfax, Fauquier, Isle of Wight, Loudoun, Madison, Nansemond, Norfolk, Northampton ..... October 1-15 and November 19-January 20
Albemarle, Greene, Greensville, Southampton ..... September 1-15 and November 19-January 20
Bland, Dickenson, Lee, Montgomery, Pulaski, Russell, Smyth, Tazewell, Washington, Wise, Wythe ..... September 15-30 and November 19-January 10
Botetourt, Clarke, Craig, Frederick, Page, Roanoke, Rockbridge, Rockingham, Shenandoah, Warren ..... October 1-15 and November 19-January 10
Buchanan ..... September 1-30 and November 19-January 5
Carroll, Floyd, Franklin, Henry, Patrick ..... September 1-January 20
Giles, Grayson ..... September 15-October 15 and November 19-January 1
Scott ..... September 15-30 and November 19-January 5

Bag Limit—6 a day, 75 a season.

TRAPPING SQUIRRELS IS UNLAWFUL.

FOX

OPEN SEASONS:

Hunt with dogs, Statewide ..... September 1-August 31

Exceptions:
Amelia unlawful, daytime only ..... April 1-September 1
City of Warwick ..... October 1-January 20
Clarke, Fairfax, Fauquier, Loudoun, Rappahannock ..... September 1-March 31
Foxes may not be hunted with dogs in Clarke County during the deer season.

Hunt with guns:
East of Blue Ridge ..... October 1-January 20
West of Blue Ridge ..... November 19-January 10

Exceptions:
(a) Open season on all National Forest lands ..... November 19-January 10
(b) Except in Tazewell, season closes ..... January 20
(c) Buchanan ..... October 15-January 31
(d) Chesterfield, Franklin, Grayson, Patrick, Pittsylvania ..... November 19-January 31
(e) Frederick, hunt with gun and/or dog, regardless of snow ..... November 1-February 28
(f) King and Queen, Red fox, continuous open season with gun and/or dogs.
(g) Lunenburg ..... October 1-January 31
(h) Rockingham ..... October 1-March 31
(i) Scott, Washington and Wythe ..... October 1-February 28
(j) Rockbridge, continuous open season.
(k) Unlawful to shoot foxes in Albemarle, Amelia, Amherst (except in National Forest area), Appomattox, Charlotte, Clarke, Culpeper, Dinwiddie (Darville District only), Fauquier, Halifax (except on regularly organized game preserves), James City, Loudoun, Louisa, Nottoway (except red foxes), and Rappahannock.
(l) Lawful to hunt red foxes in Middlesex and Nottoway Counties ..... October 1-January 31
(m) King George and Prince Edward ..... November 19-January 20
(n) Stafford—unlawful to shoot foxes from ..... October 1-January 31
(o) Owner or tenant may kill or have killed foxes at any time on his own land under his control.

HUNTING REGULATIONS

TRAP:

Unlawful to trap foxes with steel traps except when done on land by owner, members of his or her household, tenants, or those having permission to do so from the landowner or his or her agent.

Open Season: Statewide ..... November 15-January 31

Exceptions:

Albemarle ..... November 1-November 30
Nelson ..... November 1-January 20
Trapping foxes in Clarke, Fauquier, Loudoun and Rappahannock prohibited.
Buchanan ..... Continuous open season

MINK, OPOSSUM AND RACCOON*

OPEN SEASONS:

Statewide to hunt opossum and raccoon ..... October 15-January 31

Exceptions:

National Forest area ..... November 19-January 10
Essex, continuous open season on raccoon.
*Raccoon may be hunted in the counties of Accomack, Amelia, Appomattox, Brunswick, Buckingham, Campbell, Caroline, Charles City, Charlotte, Chesterfield, Cumberland, Dinwiddie, Fluvanna, Goochland, Gloucester, Greensville, Halifax, Hanover, Henrico, Isle of Wight, James City, King George, King and Queen, King William, Lancaster, Louisa, Lunenburg, Mathews, Mecklenburg, Middlesex, Nansemond, New Kent, Norfolk, Northampton, Northumberland, Nottoway, Powhatan, Prince Edward, Prince George, Princess Anne, Richmond, Southampton, Spotsylvania, Stafford, Surry, Sussex, Westmoreland and York and in the cities of Warwick and Hampton ..... October 1-January 31
Statewide to hunt and trap mink ..... December 15-January 31
Statewide to trap Opossum ..... December 1-January 31

Statewide to trap:

*Raccoon (closed season) except in the counties of Accomack, Amelia, Appomattox, Buckingham, Brunswick, Caroline, Charles City, Cumberland, Dinwiddie, Gloucetser, Greensville, Halifax, Isle of Wight, James City, King George, King William, Lancaster, Lunenburg, Mathews, Mecklenburg, Middlesex, Nansemond, New Kent, Norfolk, Northampton, Northumberland, Nottoway, Powhatan, Prince Edward, Prince George, Princess Anne, Richmond, Southampton, Surry, Sussex, Westmoreland, York and in the cities of Hampton and Warwick ..... December 15-January 31
Essex and King and Queen, trap raccoons ..... January 1-March 15

Bag Limits—Opossum and mink: NONE. Raccoon, 3 a day, 20 a season, except west of Blue Ridge Mountains, 2 a day, 12 season; Scott County, 1 a day, 3 a season; individual or organized hunt.

MUSKRAT AND OTTER

OPEN SEASON—To hunt ..... none
To trap otter ..... December 15-February 28
To trap muskrats ..... January 1-March 15

No Bag Limit.

BEAVER

OPEN SEASON—To hunt ..... none
To trap ..... By special permit to landowners

IT IS UNLAWFUL:

For any person to hunt with firearms while under the influence of any narcotic drug or any other self-administered intoxicant or drug of whatsoever nature. Game Wardens and Sheriffs shall enforce the provisions of this act;

To hunt or kill any wild bird or wild animal, including any predatory or undesirable species, with firearms or other weapon on Sunday;

To hunt deer with dogs west of the Blue Ridge;

To hunt or attempt to kill any species of game after having obtained the day's bag limit or the season's limit during any one day or any one season;

To occupy any baited blind or other baited place for the purpose of taking or attempting to take any wild bird or wild animal or to put out bait or salt for any wild bird or wild animal for the purpose of taking or killing;

To kill or capture any wild bird or wild animal adjacent to any area where a field or forest fire is in progress;

To shoot any game bird or game animal from an automobile or other vehicle;

To hunt or track woodcock or non-migratory game birds or game animals in the snow except that bear and deer may be hunted in the snow and landowners may kill rabbits in the snow on their lands for their own personal use, and foxes may he hunted with dogs, but not with guns, in the snow;

To hunt, capture, possess, transport, ship, sell or attempt to do so, any wild bird or wild animal except as specifically provided by law or regulation; or to destroy or molest the nests, eggs, dens or young of any wild bird or wild animal at any time without a permit, except predatory or undesirable species;

To hunt with either a dog or a gun or be in possession of any firearm (except peace officers and game wardens) in the National Forest during the general hunting season;

To have in possession loaded firearms on any public highway unless such person is authorized to hunt on private property on both sides of such highway in counties having a population in excess of four thousand and not in excess of four thousand, five hundred;

To shoot a rifle or pistol at wild birds and wild animals on or over the public inland waters of this State or to carry a loaded rifle or pistol on a boat or other floating deviee on said public inland waters for the purpose of hunting wild birds and wild animals, except when said rifle is being transported for this purpose from one point to another unloaded;

To hunt furbearing animals in any county in the daytime with firearms, except during the general open season for hunting game birds and game animals in the county;

To cut den trees (Statewide) or to smoke out raccoons from dens or to fell, cut, mutilate or destroy in any manner any tree which is the den or lair of any wild game in the County of **Grayson;** or to carry any axe, saw or other tool or instrument used for the purpose of felling, cutting, mutilating or destroying trees while hunting at night in **Grayson** County;

In **CAROLINE** County to hunt or shoot any wild bird or wild animal with a rifle larger than twenty-two calibre using in such rifle any ammunition larger than a twenty-two short, twenty-two long, or twenty-two long rifle cartridge. Unlawful to hunt deer in **CAROLINE** County with a rifle;

To use crossbows or poison arrows at any time for the purpose of hunting wild birds and wild animals;

(Statewide) to hunt or kill deer with a rifle of a calibre less than twenty-five; provided that in the Counties of **CHARLES CITY, CHESTERFIELD, ESSEX, HANOVER, ISLE OF WIGHT, NEW KENT, PRINCE GEORGE SOUTHAMPTON, SURRY, SUSSEX, NANSEMOND** and **NORFOLK** (except that part of the Dismal Swamp in Nansemond and Norfolk Counties located as much as 100 yards from any railroad or public highway, and then only when the rifle is used on a stand elevated not less than 15 feet above the ground), it shall be unlawful to use a rifle of any calibre for the hunting and/or killing of deer;

To hunt game in the Counties of **APPOMATTOX** and **BUCKINGHAM** with a rifle larger than a twenty-two (22) calibre;

To chase foxes with dogs in **APPOMATTOX** County on Sunday;

To hunt in **ARLINGTON** County;

To have gun or rifle with dog in the daytime in the fields, woods or waters of **AUGUSTA, CLARKE, FREDERICK, PAGE, SHENANDOAH** and **WARREN** and in Counties east of the Blue Ridge, **EXCEPT** in **PATRICK,** during the general closed season, except where migratory game birds, deer, bear, and fox may be hunted during other periods; and except as to rabbits and squirrels by landowners upon their own lands;

To hunt in **BUCHANAN, DICKENSON** and **TAZEWELL** Counties whilst having in your possession any axe or saw, without obtaining permission of the landowner;

In **CHARLES CITY** County to hunt with a rifle of a calibre of more than twenty-two;

To hunt deer with rifle or shotgun loaded with slugs in **KING WILLIAM** County;

In **NORTHUMBERLAND** County to hunt with high velocity, long range rifles, shot guns loaded with slugs and pistols or revolvers of a larger calihre than 22 rim fire.

To hunt deer with shotgun, rifle or pistol loaded with slugs in **PRINCE GEORGE** County;

To shoot any firearm from any boat or other floating device while hunting wild birds and wild animals on the Appomattox River between the mouth of Namozine Creek and Genito bridge or to carry any firearm on a boat or other floating device on said river for the purpose of hunting between the points mentioned, except when such firearm is being transported unloaded;

To have in possession any shotgun or rifle for the purpose of hunting wild birds or wild animals on the water areas, including shores of the sea in **ACCOMACK, NORTHAMPTON** and **PRINCESS ANNE** Counties during the closed season on migratory game birds, provided, that this shall not apply to persons holding permits granted by the Executive Director of the Commission authorizing the same, or to persons engaged as officers of the peace, while actually in the performance of their duties as such. For the purpose hereof the word "possession" shall include having a gun for the purpose of hunting wild birds or wild animals in one's boat or other conveyance while in the above mentioned areas;

To shoot any firearms at wild birds or wild animals from any boat or other floating device on the waters of the Blackwater River, Somerton Creek and Nottoway River from Monroe Bridge to the mouth thereof and Lawns Creek dividing Isle of Wight and Surry Counties beginning at Mills Bridge thence northeast six miles to the James River, or to carry any firearm on a boat or other floating device on said waters hetween the points aforesaid for the purpose of taking wild birds or wild animals, except when such firearm is being transported directly across the said waters unloaded for the purpose of hunting during the open season for hunting deer in that section;

To shoot any firearm at wild birds or wild animals from any boat or other floating device on the waters of the Nottoway River in Sussex County, or to carry any firearm on a boat or a floating device on the said waters for the purpose of taking wild birds or wild animals except when such firearms are being transported directly across the said waters unloaded for the purpose of hunting during the open season in that section for the taking of upland game;

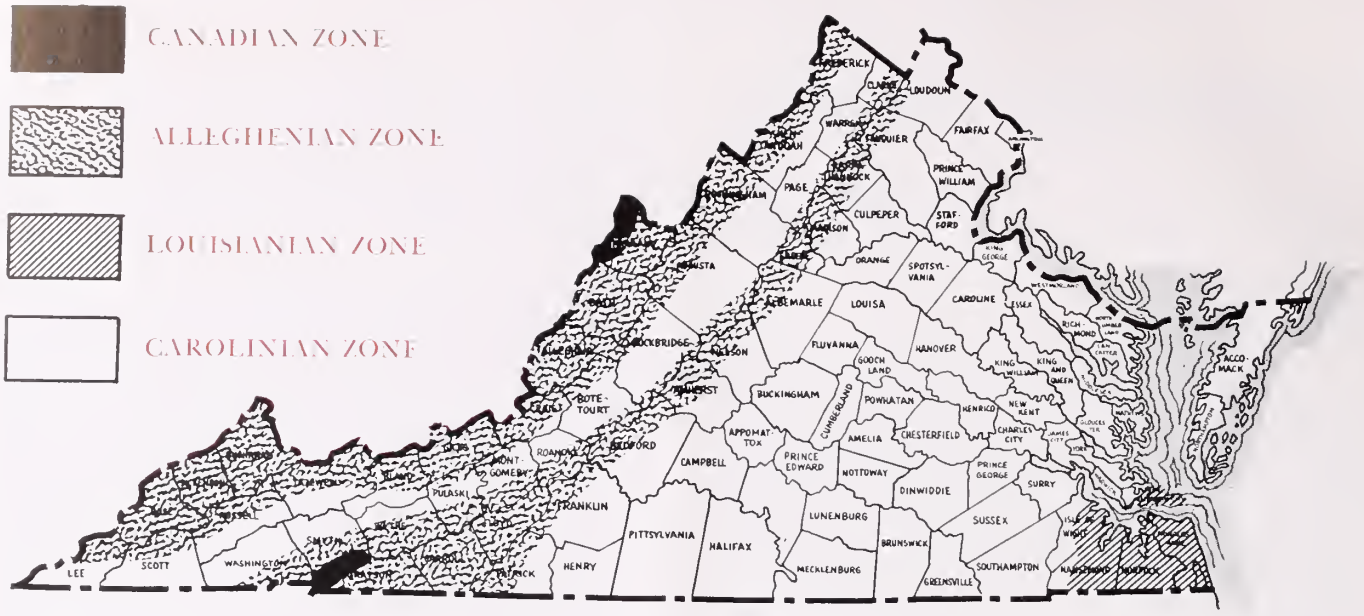
To use dogs for hunting bear, foxes and bobcats during open season for hunting deer in **ALLEGHANY, AUGUSTA, BATH, BOTETOURT, CLARKE, FREDERICK, HIGHLAND, PAGE, ROCKBRIDGE, ROCKINGHAM, SHENANDOAH** and **WARREN** Counties, and within the National Forest boundaries.

LICENSE FEES

City resident, to hunt in County where City is wholly located	$1.00
City resident, to fish in City	1.00
County resident, to hunt and fish	1.00
State resident, to hunt	3.50
State resident, to fish	3.00
State resident, Big Game Stamp, to hunt bear and deer	1.00
National Forest Stamp, to hunt, trap and fish	1.00
Nonresident, to hunt	15.75
Nonresident, to fish	10.00
Nonresident interstate (North Carolina and Virginia) 3 consecutive days to fish in Kerr Reservoir)	1.00
Nonresident, 3 consecutive days to fish in public impounded waters, statewide, and in public streams east of the Blue Ridge Mountains not stocked with trout	1.50
Nonresident, Big Game Stamp, to hunt bear and deer	2.50
Special Stamp, to hunt bear and deer in Bath, Bland, Botetourt, Buchanan, Craig, Grayson, Giles, Highland, Rockbridge, Smyth, Tazewell, Washington, Wise and Wythe	1.00
Nonresident in Grayson, Smyth and Wythe	5.00
County resident, to trap	3.00
City resident, to trap in Warwick and Hampton	3.00
State resident, to trap	7.50
Nonresident, to trap	50.00

License is required to take, capture or kill **any** wild bird or wild animal except of landowners, their husbands or wives and their children, resident or nonresident, within the boundaries of their own lands.

Licenses may be obtained from the Clerks of the Circuit Courts of the counties or the Corporation Courts of the cities and other authorized agents.



Virginia, stretching as it does from salt water to the high mountains, is a state with a great variety of territory and embraces four life zones.

Virginia's Four Life Zones

By DR. J. J. MURRAY
Editor, The Raven

TO TRAVEL from the Dismal Swamp to the top of Mt. Rogers means covering about 350 miles horizontally and more than a mile up from sea level. If the traveler is interested in the plants and animals along the way, he will notice many changes as he goes. By the time he reaches the end of his journey most of the plants and animals will be different from those he saw as he set out. A few of the birds and plants which he saw along the George Washington Canal will still appear on the spruce-clad slopes of Mt. Rogers; other species will be represented at each end of the trip by closely related varieties; but many of them will be entirely different.

The changes along this journey will be continual. As he proceeds farther west and higher into the hills, he will leave behind him at each stage certain species and in turn will pick up new varieties. It is just what he would notice on a greater scale in a trip from our most southern national park, Everglades in Florida, to Acadia, the most northern park in Maine. In other words, practically no kind of bird or flower is found everywhere in America. Some are more widespread than others, but each species has its favorite geographical belt. For example, you would never expect to find brown-headed nuthatches in Highland County, nor would you look for snowshoe hares around Back Bay.

In flat country these changes take place very gradually, but in western Virginia where the mountains are lifted toward the sky they may be observed in the space of a few miles. In Rockbridge County, where one can climb in a morning's hike from 750 feet at Balcony Falls on the James to 4000 feet on Thunder Hill, he will pass through three quite different belts of life, or life zones. The fact of change, however, will be noticed on any trip of length. For this reason naturalists have tried for a long time to classify the ranges of plants and animals and to relate them to certain features of geography and climate.

About seventy years ago a government scientist in the Department of Agriculture, Dr. Clinton Hart Merriam, became interested in the phenomena of animal distribution in America and sought to chart these variations into belts, or what he called life zones. He found that while there is steady change from place to place, there are fairly definite zones, inhabited by associated groups of plants, insects, reptiles, birds, and mammals. In seeking the causes of these groupings or zones, he came to the conclusion that temperature is almost the controlling factor. Temperature, of course, is correlated either with latitude or altitude, for you can find the same temperature and therefore the same associations of plants and animals either by moving northward or by moving upward into higher country. In general, you can find a similar cool weather group of plants and animals either at sea level in central Canada or at 5700 feet at the top of Mt. Rogers.

Dr. Merriam's summary of the factors in distribution has had to be greatly modified. He placed entirely too

much reliance upon temperature as a single factor. Humidity, particularly what climatologists call the precipitation/evaporation ratio, is just as important. There are lesser factors also. It has been found that his zones cannot be marked out as simply in the wide stretches of the central prairies as in the mountains of the West, where he first worked out his theories, or of the East. Nevertheless, his mapping of the zones was sound.

Merriam divided the eastern United States into three major regions—the Boreal, the Austral, and the Floridian (Sub-Tropical)—with three zones in each of the first two, but only one in the Floridian, which covers only the lower tip of Florida. The zones of the Boreal region are the Arctic, the Hudsonian, and the Canadian; while the zones of the Austral region are the Alleghenian (also called the Transition), the Carolinian (or Upper Austral), and the Louisianian (or Lower Austral).

Virginia, stretching as it does from salt water to the high mountains, is a state with a great variety of territory. Four of these life zones are represented. The lowest, the Louisianian, is found only in the southeastern tip of the state, while the highest, the Canadian, barely touches a few spots. The other two cover a wide territory. As the writer is more familiar with birds than with other animals or plants, they will be used as illustrations in pointing out the zones in Virginia. It must be remembered, of course, that not a few birds, such as the brown thrasher, catbird, towhee, and indigo bunting, are found all over the state, in all four of the zones. And it must also be remembered that it is only in the breeding season that we can speak of birds as characteristic of a zone, for in winter birds wander widely, especially from higher to lower zones.

The Louisianian is the zone of the low country of the southeastern United States, the country of the flooded forests. Virginia's share of this zone is limited to the southeastern tip of the state—to the Dismal Swamp and Back Bay, to Princess Anne, Norfolk, and parts of Nansemond counties, and in somewhat lesser degree of the country just across the James. Because this part of Virginia is the northern outpost of the Louisianian zone, the territory is not quite typical of the zone as we find it farther south. This is the land of the long leaf pine, the live oak, the cypress, and the fragrant magnolias; the land of the scuppernong grape and the gardenia; the land where the mockingbird sings its sweetest and the chuck-will's-widow calls at night. The characteristic birds of this zone in Virginia are the red-cockaded woodpecker, the chuck-will's-widow, the brown-headed nuthatch, and the Wayne's, Swainson's, and prothonotary warblers. These birds are rarely found higher up or farther north than this lower Tidewater country.

The most important zone in Virginia, because its territory is far the greatest in the state, is the Carolinian. With the exception of the southeastern tip, the Carolinian zone covers the whole of Virginia east of the Blue Ridge, and also the floor of the Great Valley and of most of the wider valleys of southwest Virginia. It thus occupies more than three-fifths of the state, all of the territory in the upper Tidewater, in the Piedmont, and in the mountains below 1500 feet. It has its interesting animals and plants, but is the least varied of the four zones. This is the country of the sassafras, the tulip poplar, the Virginia pine, and, away from the mountain influence, of the beautiful sweet gum. It is the zone for which it is most difficult to name a characteristic group of birds. The Louisiana water-thrush and the yellow-breasted chat are among the most characteristic. There are certain birds—Acadian flycatcher, blue-gray gnatcatcher, mockingbird, white-eyed vireo, prairie warbler, summer tanager, blue grosbeak, and cardinal—which normally find here their upper limit. Certain other birds—tufted titmouse, wood thrush, Kentucky and worm-eating warblers—are most at home here, although they occur both below and above this zone. When all of these birds are found together, however, we may be certain that we are in Carolinian territory.

The Alleghenian zone covers something more than one-fifth of Virginia. It occupies the mountains, except for the wider Carolinian valleys and a few mountain tops, which means practically all of the mountain country above 1500 feet. At the same time it should be pointed out that the open hill country up to 2000 feet in southwest Virginia shows Carolinian influence. This is just a further indication of the fact that the boundaries of the zones cannot be marked out too strictly. Boundaries between zones are rarely regular. That between the Alleghenian and Carolinian zones in western Virginia is exceedingly irregular, much more so than can be indicated on any small scale map. This is due in part to the fact that the clearing of the forests by man and the opening of the ground to the sun has affected both the temperature and the humidity of the mountain areas, and so has shifted the boundaries of the zones downward.

As one of its names, Transition, indicates, the Alleghenian zone is a borderland territory where northern and southern elements overlap. The southern character predominates in it. It is an area of biological tension, where forces from north and south are battling. As a result, the territory on the edge of the zone is constantly in a state of change from one zone to the other, sometimes the northern forces of cold and wet winning, and more often, because man's interference gives them the advantage, with the southern forces gaining.

The Alleghenian zone produces the richest tree flora in America, if not in the world, because the oak, hickory, chestnut (formerly and, we hope, again in the future), and walnut push in from the south to meet the hardy maples, beech, birch, white pine, and hemlock of the north. Here our greatest variety of warblers is found. Here the titmouse and wood thrush meet the veery, the mountain vireo, the scarlet tanager, the junco, and the rose-breasted grosbeak. It is the zone where not only the greatest variety of trees but also of other plants and of animals is found.

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Commission Photo by Kesteloo

The teacher-students actively participated in the laboratory demonstrations to receive firsthand observations of the conservation problems being studied.

The Conservation Short Course At V.P.I.

By JOE L. COGGIN
Special Services Officer, Western District

CONSERVATION education in Virginia received a major boost June 13 to June 29, 1956, when a conservation short-course was held at Virginia Polytechnic Institute. This was a highly concentrated program embracing studies in the conservation of water, minerals (geology), soil, forestry and wildlife. Its purpose was to enable public school teachers to obtain additional training in proper resource use and, as a result, increase the effectiveness of conservation and resource-use teaching in Virginia's public schools.

This short course, conceived by the Virginia Resource Use Education Council, was the result of long and serious consideration as to ways of obtaining greater public understanding of the need for conservation and means of accomplishing it. Mr. A. L. Wingo, Supervisor, Division of Research, State Board of Education, was chairman of the Council, and its members representatives of the various conservation agencies of Virginia.

Private industry also played an integral part in the program. Many Virginia business and sporting organizations, concerned directly or indirectly with natural resources, have long realized the need for a better understanding of conservation principles by the general public. What better way could be found to reach the younger generation with our conservation message than through our public school teachers?

Sufficient funds, totaling $2,500, were donated to the Council by interested organizations and firms to provide twenty-five teachers with one-hundred-dollar scholarships to attend the course. Four other teachers attended at their own expense. Only teachers who were genuinely interested in teaching conservation of natural resources to children in public schools of Virginia were eligible to attend.

The program has already been referred to as "highly concentrated." This is indeed a good description of the work. The brochure gives the following outline of each subject as it was taught:

1. Geology—The origin and nature of the earth's crust; the forces at work to alter rocks and minerals composing the crust, to form mineral deposits, and to concentrate oil and gas into commercial pools; the origin and nature of mineral deposits, with examples from Virginia's mineral resources; surface water and ground water as they work to break down and modify the earth's crust through weathering and erosion, and also water as it pertains to the needs of man.

2. Soil—The parts of soil and their importance; how soil contributes to plant growth; the relation of soil to the parent material from which it was formed, the soil profile, what it is and its characteristics; and the important soils of Virginia, their use and care.

3. Forests—Forest conservation as it relates to the management of timberland areas; use of the forest as a source of raw material for the wood using industries, for soil stabilization, for watershed protection, and for recreation.

4. Wildlife—Properties of animal populations that are of importance in controlling animal numbers; relation of animals to soil, water, and forests, and the inter-

relations of these four basic natural resources to man and his welfare.

Laboratory work and field trips were included in the program to allow the students first-hand observations of the conservation problem being studied. Representatives from the many state conservation agencies were present for evening programs to discuss the work of their respective organizations. Appropriate conservation movies were shown to the group to further illustrate the extent, use, and problems of Virginia's natural resources.

The members of the Resource Use Education Council and those who taught the courses agree wholeheartedly that the short course was a success and accomplished its purpose for the small group attending. It is not enough, however, for us to say "we think it is good!". . . the proof lies in the results.

The opinion of the teachers attending the course was considered even more important and it was decided to have each complete a questionnaire, in which they could give their unbiased opinions on ten questions relating to the course, and suggestions they might offer for its improvement. The following is a brief analysis of the information obtained directly from the public school teachers who took the course:

Since four methods were used for teaching the course . . . field trips, laboratory demonstrations, movies, and course work . . . the teacher-students were asked which method was most helpful to them. Nine indicated the field trips; two, the movies; and eighteen, the course work. Although no person out of the total twenty-nine listed laboratory demonstrations as being most helpful, five wrote an important note on the margin of the questionnaire stating that all methods were very necessary. And all twenty-nine stated that the workshop made them better prepared for teaching conservation in Virginia's public schools.

Money is always a fascinating subject, and thus prompted a very interesting question to the students: "If you had not received the scholarship money, would you have taken the short course anyway?" Fifteen said yes, and fourteen replied no, but it is interesting to note that three indicated on the margin that they would not otherwise have been financially able to attend. Four, of course, did attend without scholarships.

All the teacher-students indicated that they thought the course should be continued at V.P.I. and that it was advisable to open more conservation workshops at other Virginia institutions; four wrote in the margin, "if other institutions have the facilities for teaching this course." This question is important in that expansion of this program to other institutions would help provide this training for more of our public school teachers.

Agriculture teachers and many biology teachers throughout Virginia's public schools are doing a fine job "sandwiching" conservation into their respective courses. The time spent on teaching conservation is necessarily limited in our public school system and with this in mind, the question was asked; "Should conservation be a part of the public school curriculum?" Everyone answered "yes;" twenty-three saying it should be taught as a part of some other course and four preferring that it be taught as a separate course. Two persons did not indicate a preference as to how it should be taught. Their opinion as to the grade to start teaching conservation in our public schools was quite varied, however. Twenty-two suggested the first grade; one the second; four the third; and one the fourth grade. Still another teacher-student suggested it be taught in kindergarten. It is interesting to note that in no case did anyone feel that a child should get past the fourth grade without having learned something about conservation.

It is indeed a credit to those who initiated, taught, or offered other valuable services to the short course, that the entire twenty-nine school teachers stated very definitely that they would "recommend this course to other teachers." Probably no other single indicator gives more insight as to whether the short course was a success.

Since this workshop was considered a pilot course in

Experts in all phases of our natural resources conducted trips into the field to point out important aspects of the resource picture.

Richmond Times Dispatch Photo by Crockford

A demonstration of the tools and equipment used in forest fire detection is an example of the firsthand observations given the teachers.

Virginia, the participants were asked if they were satisfied with the course and to make any suggestions that they thought might aid in future conservation workshops. Twenty-four indicated they were satisfied with the way the course was presented; and five did not comment. Seven made no suggestions, but twenty-two participants offered from one to five suggestions for improvement. Actually, twenty-four different suggestions were given. Space does not permit a discussion of all suggestions. However, twelve teacher-students commented on the tight schedule which offered very little free time for study or corollary reading. These twelve teachers thought the course should be extended over a longer period with more free or study time during the course. This is quite understandable, in view of the fact that mornings, afternoons, and evenings were scheduled for class work, field trips, and lectures. This, of course, left very little time for studying lessons and preparation of material to later be used in actually teaching their own students. This suggestion, as well as many others, will receive serious consideration when plans are made for future workshops.

It must be understood that this questionnaire reflected only the opinions of those who took the course and is not necessarily a "sample" of what the teachers of Virginia may think about it. This is in part because only teachers who were interested in teaching conservation to their pupils received scholarships to attend the course.

Judging from the opinions reflected on the questionnaire and discussions of various people who were directly concerned with the course, the workshop accomplished its purpose. This can only be said in a limited sense, however, because twenty-nine teachers is only a very small percentage of our conservation-minded school teachers. The job is really just beginning; and it is hoped that we can continue and expand this short course in the interest of conservation education in Virginia.

ARE WE KILLING THE HENS? (Continued from page 11)

years the wild turkey will be completely exterminated in Piedmont and eastern Virginia. What can be done by the sportsmen of Virginia to prevent further decline of our wild turkey flocks?

One constructive action that undoubtedly would help to compensate for the destructive factors mentioned above, would be to STOP THE PROMISCUOUS KILLING OF WILD TURKEY HENS. As our friend the conservationist earlier pointed out, the hen is the key to the entire situation; she is the one that "lays the golden eggs." In Virginia, ever since the colonization at Jamestown, it has been customary to shoot both sexes of turkeys indiscriminately. The wild turkey hen has not been protected or respected as is befitting her sex, yet she probably could provide the answer to the entire turkey problem. Over the past five years (1951-55) since it became compulsory to check deer, bear and turkeys at contact stations, the sportsmen of Virginia have collected 11,150 turkeys of both sexes. Of this number, approximately 53% (5309) have been hen turkeys. In order to stress the importance of the female of the species, let us assume that all of these hens had not been killed and that each of them successfully raised one gang of ten poults. Simple arithmetic shows that a fantastic 59,090 turkeys would have been produced. Naturally, there are so many factors involved that this example would be an impossibility from a practical standpoint, but it should illustrate the point.

Virginia's sportsmen need not search any further than their greatly expanded deer herds to prove to themselves that by protecting the female of the species, they themselves have helped to increase the statewide deer population to the point where in1955-56 seven times more deer (14,227) than turkeys were killed.

In the future a voluntary united action on the part of all the hunters could stop the needless killing of turkey hens. Perhaps it would be necessary for the Game Commission (if they find it essential) to enact regulations prohibiting the shooting of the female turkeys. In either case, the full and conscientious cooperation of all of Virginia's hunters will be needed. Many southern states have had "gobblers only" seasons for years and they have been most successful. In these states a hunter who would intentionally kill a hen is automatically branded by his hunting companions in much the same fashion as a doe slayer was years ago. The emphasis is placed on sportsmanship, ability to skillfully imitate the turkeys, on the weight of the turkey tom and on the length of his beard and spurs.

One of the most persistent objections presented against a gobblers-only season is the argument "how can you tell a gobbler from a hen while it is flying?" The answer to this one is that you seldom can positively identify a turkey in flight, but if you *call* them up to a blind and look them over carefully, it's usually a simple matter. About five years ago a gobblers-only season was attempted on the Cumberland State Forest in the fall of the year. The hunters complained bitterly at first and ridiculed the State Forest Service and the Game Commission for even trying such action. However, each hunter was issued an instruction sheet asking him to shoot at the beard rather than at the turkey. At the end of the three-day hunt 12 adult gobblers had been killed and the officials who were responsible for the experiment were complimented highly by a large percentage of the hunters who participated. They had never realized before what a wonderful sport it is to match wits with a wily gobbler and to be forced to look a turkey over carefully before shooting.

In the spring, when some of the states hold their gobbler seasons, there is no mistaking a gobbler from a hen while calling from a blind. Naturally the gobbler gobbles and his head has the appearance of a snowball on a stick, since his head is so predominantly white.

More and more Virginia sportsmen are coming to the realization that hunting of all types should be for

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THE WILDLIFE MANAGEMENT INSTITUTE—

An Organization Dedicated to Wildlife Restoration

By DR. IRA N. GABRIELSON*

BECAUSE wildlife is one of America's most important recreational resources and forms the basis of an important segment of the American economy, the Wildlife Management Institute was organized in 1946 to promote businesslike management and administration of this resource in the public interest. The Institute, a non-profit private membership organization, was established to carry on the public activities of predecessor organizations with a history dating back to 1915.

The Institute has advanced the concept that wild populations are products of their environment and that the maintenance of hunting, fishing, and other recreational values depends upon sound management and use of all renewable natural resources. Except on refuges and shooting preserves, deer, turkeys, grouse, pheasants, and quail are by-products of farming and forestry. Land which can produce only poor crops is equally unproductive of wildlife. Streams which are converted into eyesores through siltation, resulting from improper watershed management, and into community hazards through pollution produce little if any sport fishing and a minimum of the requirements of waterfowl and furbearers. For this reason, the Wildlife Management Institute has vigorously supported programs designed to improve the management and speed the restoration of forest, water, and soil resources and has opposed with equal vigor needless waste and extravagance in their use.

*The author is president of the Wildlife Management Institute.

The Virginia Cooperative Wildlife Research Unit, located at V. P. I., is supported jointly by the Institute, V. P. I., Virginia Game Commission, and the Fish and Wildlife Service.

The Institute sponsors the annual North American Wildlife Conference, which has developed into the largest and most important conservation meeting on the continent. At these conferences, all aspects of renewable natural resources are discussed in public meetings by the foremost authorities in their fields. The meetings, which attract men from nearly every state in the Union, Alaska, Puerto Rico, and Mexico, all provinces of Canada, and several nations outside North America, are held in one of the major cities each year. All sessions are open without charge to anyone interested in the great variety of subjects which are discussed. The 22nd North American Wildlife Conference will be held in Washington's Hotel Statler on March 4, 5, and 6, 1957. Numerous national conservation organizations schedule related meetings in conjunction with the conferences.

In addition to this important activity, the Institute sponsors research into pressing wildlife problems, assists in training students in wildlife management, and aids state organizations and agencies in improving wildlife administration and management techniques. Through field men strategically located throughout the United States, direct on-the-land assistance is given to landowners and local organizations. Two wildlife research stations are operated cooperatively by the Institute in Manitoba and New Brunswick, and the Institute participates in the Cooperative Wildlife Research Unit program which has done much to advance the training of young men in the science of wildlife biology. Units, each supported jointly by the state fish and game department, the college, the U. S. Fish and Wildlife Service and the Institute, are located at 16 land-grant colleges in the United States and Alaska.

A major service of the Institute, which has developed in the last few years, consists of making complete analytical surveys of the laws and functions of state conservation departments. Such surveys are initiated at the request of the governor or state legislature with the consent of the department or by the agency responsible for state wildlife administration. Such surveys, which are designed to improve the efficiency and effectiveness of their wildlife programs, have been completed for more than a tenth of the states. In a number of instances these investigations have resulted in important amendments and recodifications of fish and game laws and in major revisions of administrative procedure.

A public information program is conducted through regular news releases to outdoor writers and editors, edu-

cators, and leaders of conservation groups throughout North America and by the distribution of literature ranging from free brochures to high-quality books. The Institute also publishes the annual Transactions of the North American Wildlife Conference which, with the published proceedings of the earlier American Game Conference, now forms the "3-foot book shelf" of conservation.

The Institute's staff of experts gives direct assistance to landowners, sportsmen, and civic organizations on questions relating to wildlife resources through correspondence, public addresses, and by direct contact.

Offices of the Institute are located at 709 Wire Building, Washington 5, D. C., and further details on its program may be obtained from that address.

The Institute makes no charge for its services; its staff is at the disposal of anyone interested in wildlife who desires information or advice in this field.

CHEMICAL CONTROLS (Continued from page 13)

and remain toxic for long periods. This, together with the fact that they can be adapted for distribution by airplane, make them effective in controlling insects.

An important ideal in insect control is the development of chemicals that are specific for particular pests.[16] While there is a tendency in this direction, the lethal properties of chemicals now used are by no means restricted to injurious insects. Beneficial animals, including beneficial insects, unfortunately, also are susceptible. As a result, serious and unnecessary damage to wildlife and fishery resources sometimes occurs.

DDT was the first of the newer insecticides to be widely used, and its relation to wildlife has been studied more than that of any of the other chemicals. The effects of DDT upon mammals have generally been found more harmful than those of methoxychlor, TDE, technical BHC, chlorthion, and malathion. It appears that lindane, toxaphene, and chlordane are of intermediate toxicity, while aldrin, dieldrin, endrin, heptachlor, diazinon, EPN, TEPP, and parathion are more toxic than DDT to mammals. It is difficult to generalize, however, since toxicity varies greatly with the different species, the formulation, dosage, period of feeding or exposure, mode of entry into the body, and various environmental and other conditions.

Studies with birds have shown results similar to those obtained with mammals. Mourning doves are about three times as tolerant to a number of insecticides as are bob-white quail. Ducks and other waterfowl have suffered losses from single sprayings of chlordane at one pound per acre, toxaphene at 1½ pounds per acre, dieldrin at ½ pound per acre, and aldrin at the amazingly low amount of 0.125 pound per acre. Parathion was lethal to blackbirds when applied at 0.4 pound per acre.

Effects of insecticides upon birds and mammals are likely to be more obscure if repeated small doses are involved rather than a single exposure to a larger quantity. Laboratory studies have shown that sub-lethal amounts of DDT may be stored in body fat and this accumulation can cause poisoning at a later time when fat reserves are utilized. Also, quail and pheasants fed very small amounts of DDT, aldrin, dieldrin, and endrin for several months, continued to live, but very few of the young survived. These subtle and indirect effects point up the danger of applications of insecticides having highly residual qualities.

The effects of insecticides upon fish and other cold-blooded vertebrates are often markedly different than upon birds and mammals. It was surprising to find that TEPP and parathion, which are so extremely toxic to warm-blooded vertebrates, are among the least harmful to fish. Toxaphene is one of the insecticides most damaging to fish. Dieldrin and lindane are also highly lethal to fish and complete kills have occurred with dieldrin at one pound per acre. BHC (technical grade) is a much safer insecticide, but often results in an offensive flavor when the fish are cooked.

Agricultural Insect Control

Agricultural lands, including orchards, generally receive the heaviest and most repeated insecticide applications, in some instances totalling upwards of 50 pounds per acre per season. The effects of such programs on wildlife are of vital concern, since not less than three-quarters of our upland game and fur crop is produced on these lands. Not only may wildlife be killed directly by single heavy dosages, but repeated applications of smaller amounts may deplete food supplies and make the area less attractive or suitable for animal life.[4,5,6,7,8,9,10,11] Studies in Maryland showed 20 to 30 per cent fewer song birds in those apple orchards that had received repeated applications of DDT for codling moth control totalling 20 to 25 pounds per acre per season. In recent years, codling moths in some areas have become increasingly difficult to control with DDT and this has necessitated the use of other insecticides, often more toxic than DDT.

Another hazard of agricultural insecticide programs results from natural washing of chemicals from heavily treated fields into streams and ponds with resulting damage to fish and aquatic life. Such an incident was reported by personnel of the U. S. Public Health Service during the summer of 1950 in 15 streams tributary to the Tennessee River in the cotton growing region of northern Alabama.[12,13] Light rains in July washed insecticides, mostly toxaphene, benzene hexachloride, DDT, and aldrin dusts and emulsions, from the young cotton plants and made necessary additional applications of insecticides at more frequent intervals than usual. Then, immediately following a heavy downpour in early August, there was a very heavy kill of fish, including white crappies, bass, sunfish, and various species of rough fish. The same pattern was repeated following a second heavy

rain on August 10. Large numbers of fish continued to die for the next four days, and two months later, losses were still occurring. Although 60 to 70 pounds per acre applications of formulated insecticides were suggested as the maximum for a season, it was learned that some farmers used upwards of 200 pounds, and one had applied about 600 pounds per acre that season!

To further test the toxicity of insecticide treated cottonfield soils, the Public Health Service collected samples in northern Alabama in late September, 1950. Dusting of these cotton fields had been discontinued in August—six weeks earlier. During November and December these soil samples were added to water, and goldfish (a relatively hardy species) were introduced for a week to ten days. Resulting mortality ranged from as little as one dead fish out of 16 to as high as 7 out of 8.

Follow-up studies three years later by the Alabama Department of Conservation showed that some of the contaminated streams again supported a normal number of fish, although the composition was unbalanced in favor of undesirable, non-game species. Populations of fish-food organisms appeared to be recovering but were made up of an abnormally low number of species.

There are a number of known cases of insecticidal pollution of streams following agricultural spraying, and many of these have involved serious overuse or misuse of the control poison. To kill cattle grubs, a California dairyman sprayed his herd with rotenone, a potent fish poison but relatively safe to warm-blooded animals. Drainage from his barn killed trout in a nearby stream. In North Dakota, a potato farmer using toxaphene filled his tanks and sprayers repeatedly at a nearby stream, and as a result dead suckers, northern pike, chubs, minnows, and rock bass littered the banks. Downstream for three miles there was no trace of a live fish.

Another example was brought to light several years ago[14] when leaf miners started to devastate the new rice crop in California. Chemicals not heretofore used (mostly dieldrin) were applied hurriedly and without adequate attention to procedures and dosages. The resulting loss of fish and birds of many kinds was heavy. Agencies involved immediately studied the problem, and after modifying control procedures the losses largely ceased.

A threat to the wildlife of agricultural lands in the Southeast is the control program for the white-fringed beetle. This insect was accidentally introduced into Florida about 1936 and has since spread to North Carolina, Tennessee, and Louisiana, with a local outbreak in New Jersey. Its varied feeding habits make this beetle a serious pest of agricultural, garden, ornamental and wild plants, and infested areas are now under quarantine. Control is directed primarily toward grubs in the soil. On non-cultivated land, including fence rows, ditch banks, woodlots, and other lands adjacent to agricultural fields, supervised applications of 25 pounds per acre of DDT and 3-5 pounds per acre of dieldrin are made. Such "edge" habitats are preferred living quarters for much of our wildlife on farm lands and these applications have caused severe losses among ground-feeding birds as well as rabbits and other mammals. In an area treated at three pounds of granular dieldrin per acre, little if any successful reproduction of birds and mammals was noted. Field studies have also shown single applications of one pound of dieldrin per acre to be totally destructive to fish and most other aquatic life.

(Part No. 2 to be continued in the November Issue)

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ARE WE KILLING THE HENS? (Continued from page 20)

recreation and sport rather than for the meat. This feeling is very pronounced among the avid bowhunters of the state, and is gaining impetus among many of the "died-in-the-wool" turkey hunters. They have recognized that, as some have expressed it, "they would rather kill one turkey gobbler by calling it to the blind than a carload of turkeys killed on the flush or along the side of the road." Ironically, the large majority of the turkeys collected each year could be classified in the latter accidental categories. This probably accounts for the high percentage of hens that are killed each year. (It is common knowledge to everyone who has ever hunted turkeys from a blind that the old hen is the most difficult of all to call up.) For example, of the 32 turkeys killed on the Buckingham-Appomattox Forest last fall, 18 of this number were hens and eleven of the females were adults. Significantly, only three of the 32 turkeys were killed as a result of the "yelping technique." The other 29 were collected accidentally, and primarily by deer hunters.

In a number of states where wild turkeys still remain, it has been necessary to enact drastic regulations in order to conserve for posterity this noblest of all birds. Turkey seasons have been separated from the general hunting

periods in some states; in others, it is a violation to hunt turkeys while using dogs. In most states the female of the species has been given complete protection.

Regardless of the future action which the Virginia Commission of Game and Inland Fisheries may find necessary, it should be thoroughly understood by all sportsmen that the wild turkey *must be conserved now* if we want our sons to enjoy the incredibly exciting sport of turkey hunting.

LIFE ZONES (Continued from page 17)

The Canadian zone touches only a few spots in Virginia, and even there is not typical. Indeed it is arguable as to whether we have any true Canadian territory now. Once, before the lumbermen cleared away the fine spruce forests, there was a good deal. Now there are probably not five hundred acres of old spruce left in the state. The cap of Mt. Rogers is the only fairly typical spruce area we now have. In addition there are spots partially clad with spruce along the Allegheny backbone in Highland County. Some of these spots may come back in time, though it must be a very slow process. Man can wreck in a week the type of evergreen forest that takes centuries to produce. It is not simply a matter of the time required for the trees to grow to size. This kind of forest requires tree generations enough to cover the ground with dead logs, rotten vegetation, and thick ferns. The development of public forests, state and national, seems our only hope here.

The typical trees of the Canadian zone are the more northern conifers; its typical mammals, the red squirrel and snowshoe hare; and its typical group of birds, the red-breasted nuthatch, brown creeper, winter wren, and golden-crowned kinglet, with four others somewhat less typical since they also extend downward into the Alleghenian zone, the yellow-bellied sapsucker, black-capped chickadee, hermit thrush, and magnolia warbler.

Enough has been said to show that our state has a rich and varied natural life. We should take pride in preserving that interest and that variety. Possibly enough has been said to suggest that the state should own and preserve typical areas in all of these zones and throughout the commonwealth. Why should we wait upon the federal government to protect all our natural values?

And Also Delicious

THE readers of *Virginia Wildlife* are sure to be interested in the following four wildlife recipes with which Mrs. Quinn has had success and compliments. (Mrs. Quinn should know her wildlife cookery as she is, of course, the wife of I. T. Quinn, Executive Director of the Commission of Game and Inland Fisheries!)

Roast Venison

A rump roast about 5 or 6 lbs. is best. Rub well all over with a cloth dampened with vinegar. Salt, pepper and rub with bacon fat. Put in covered roaster with about 3 cups of water, 2 large onions (sliced), several stalks of celery and one peeled raw Irish potato. Begin cooking at a temperature of 500° about 15 minutes, then reduce to 300°, and cook until tender. Baste every 15 or 20 minutes. Add 1 cup of red wine and more water as needed for basting. Remove top from roaster when nearly done, also celery and potato; and brown roast. While browning, baste with a sauce made of 1 stick of butter, 1 cup boiling water, ½ cup catsup, ½ cup chile sauce, 2 tbsp. Worcestershire sauce, 4 tbsp. lemon juice, 2 tbsp. orange juice, ¼ tsp. cayenne pepper, salt and black pepper. (Cooking time, 5 or 6 hours.)

Wild Duck

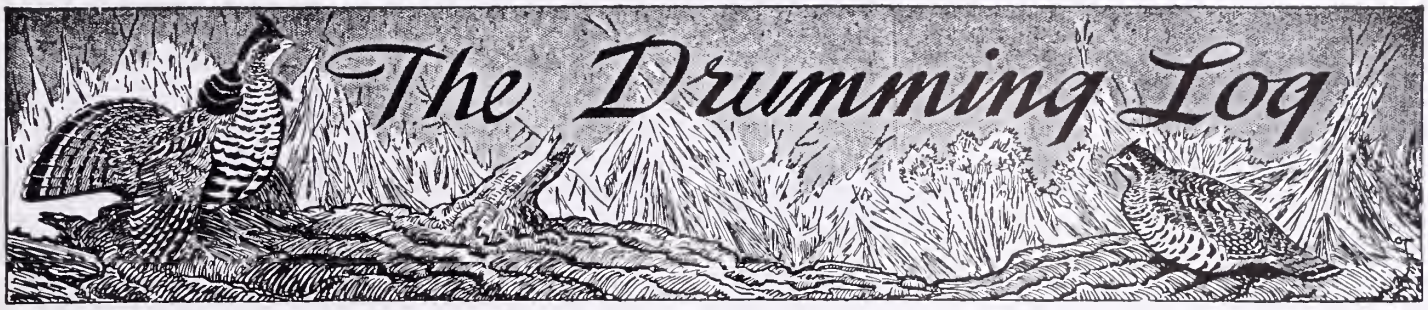
Grease ducks well with melted butter, salt and pepper. Fill cavity of each duck with half an apple, one piece of celery and half an onion stuck with 2 or 3 cloves. (Remove when ready to serve.) Place ducks in covered roaster with 2 cups of water and begin cooking in 500° oven for 15 minutes. Let thermometer drop to 350° and cook until ducks are tender. Baste about every 20 minutes. When nearly done remove top of roaster and keep ducks turned to brown evenly. For basting use ½ cup butter melted in ½ cup boiling water and ½ cup wine. After this is used, baste with fat in pan. Pour a little water in pan during cooking as necessary. (Or the same sauce used in basting venison may be used.) Garnish with watercress or parsley and thin slices of orange topped with currant jelly. Serve with wild rice. (Cooking time, 2 hours.)

Wild Rice and Mushroom Casserole

When you serve wild duck, serve a casserole of wild rice and mushrooms with it. For this, soak 1 cup wild rice in cold water for several hours. Drain, cover with boiling salted water and cook for 20 minutes. Drain, add ½ lb. fresh mushrooms (or canned mushrooms) which have been sauted in ½ cup butter. Add 2 tbsp. flour and ¾ cup milk to butter in which mushrooms were sauted. Season to taste and pour over rice and mushrooms. Pour into casserole, top with layer of buttered bread crumbs and bake in moderate oven.

Rabbit Southern Style

Cut rabbit into pieces for serving. Pour 1½ pints of salted cold water over rabbit and let stand for 2 or 3 hours. Drain, wipe and sprinkle with salt and pepper. Roll in flour. Fry ¼ lb. bacon cut in pieces in heavy frying pan; add rabbit. Cover and cook slowly 1½ hours, turning frequently. Add 1 cup milk and cook 30 minutes. Remove to serving dish and garnish with parsley.



Virginia Wildlife Federation Announces Annual Meeting

The fifth annual meeting of the Virginia Wildlife Federation will be held at the Roanoke Hotel in Roanoke, Virginia, on Saturday and Sunday, October 13 and 14, 1956.

The principle business of the meeting will be plans for strengthening the organization to present a three-point program for 1957 to overcome three current wildlife problems revealed during the past year.

These are: 1) to save as much as possible of Virginia's lands and waters now being withdrawn from public use by private, industrial, and government acquisition; 2) to make every acre of land and fresh and salt water produce a maximum amount of game and recreation for the growing sportsmen and nature loving population and still maintain adequate stock for future reproduction; 3) to discover and develop new types of sport, making use of species not now producing any benefits to sportsmen.

Registration for the meeting will begin on Saturday afternoon, with the annual banquet at 8:00 p.m. following a social hour. The business session begins at 9:00 a.m. Sunday, October 14, with a luncheon break at 1:00 p.m. It will adjourn at 4:00 p.m. after the election of officers and directors for the ensuing year.

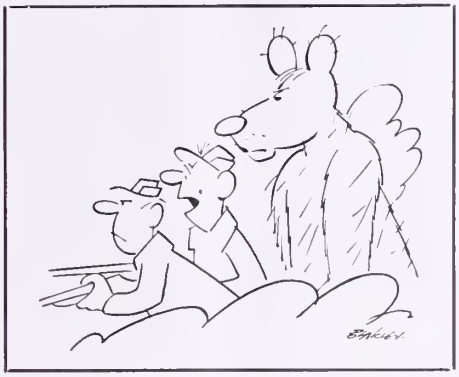
On Saturday afternoon at 2:00 p.m. the first regional meeting will be held, with representatives of the Wildlife Federations of North Carolina, South Carolina, West Virginia, and Virginia attending. Dr. Roland McClamrock, Vice President of the National Wildlife Federation and Major J. Leo Murphy, Regional Director of Region #3 will be in charge.

Triumph for Smokey the Bear

Although man-made forest fires did occur at the rate of 380 a day during 1955, that is a post-war low record according to the U. S. Department of Agriculture. In 1942 when the Smokey Bear campaign was first started there were about 575 forest fires a day.

In April 1,200 people attended a conference endorsed by the Conference of Southern Governors in New Orleans. Businessmen, religious and civic leaders, educators, public officials and foresters together formulated plans for strong educational and law enforcement programs.

Now, although public use of forests has increased over 150 percent, the number of fires has gradually decreased. As well as the well-known Smokey Bear campaign (started by the states, the U. S. Forest Service and the Advertising Council) there is the Keep Green program sponsored by the states, forest industries, cooperative work of sportsmen's groups, women's clubs, Boy Scouts, Campfire Girls, and the American Red Cross.



"Did you snort?"

Chinese Chestnuts Gain Popularity

A harvest of Chinese chestnuts in Virginia this fall is revealing a yield of excellent size, according to G. B. Aroian, associate horticulturist at VPI.

Experiment station cooperators have planted a number of varieties of the nuts, and some of those planted earlier are now fruiting. The Kuling, Nanking, and Meilling appear to be the best tried.

Aroian says that some of the Chinese varieties might replace the American chestnut, which was destroyed years ago by blight. He reports that there is a "surprising amount of interest in Chinese chestnuts."

John McLaughlin, Commission field biologist in Christiansburg, snapped this unusual picture of a common water snake which had swallowed a ten-inch rainbow trout. Barbour's Creek game manager, Bent Medley, killed the snake.

Free

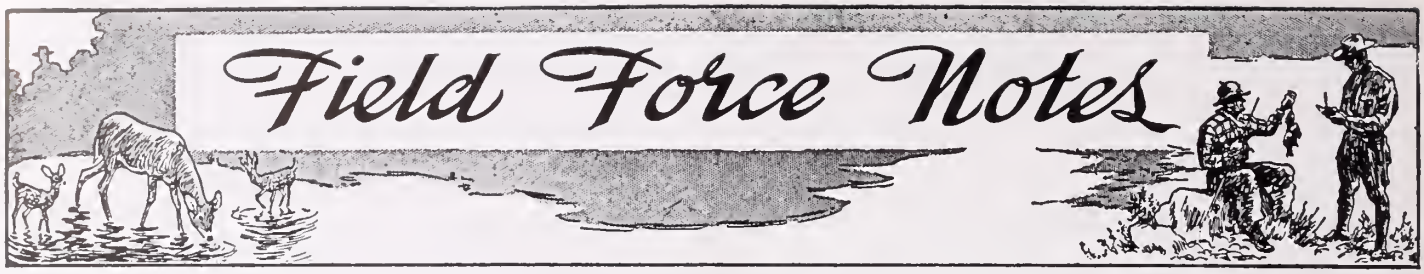
Free of worry, free of care,
Free of dust-filled city air,
Free of crowded, noisy streets
Filled with traffic's blaring bleats—

Free to heed or free to talk,
Free to run or free to walk—
Free to listen to the breeze
Tell its secrets to the trees—

Free to go or free to stay
Free to lounge or free to play,
Free to wander far and wide,
Free to sit by campfire's side—

Free of all but keen delight,
When dawn ends this star-filled night,
Free I'll be another day
To stalk that trout that got away.

J. F. D.



New Commissioner Appointed

Jacob C. Aaron, of Martinsville, Virginia, has been appointed to membership on the Commission of Game and Inland Fisheries. The appointment was made by Governor Thomas B. Stanley to fill the unexpired term of the late State Senator Frank P. Burton, from the 5th Congressional district.

Aaron, an alumnus of William and Mary College, is employed as a sales representative for the Robert Gair Company in Martinsville, manufacturers of fibre board containers. He is active in civic and fraternal organizations, a member and trustee of the First Methodist Church of Martinsville, and enjoys hunting and fishing as a principal hobby.

Commissioner Aaron attended his first meeting on August 24 at the Commission offices in Richmond, states I. T. Quinn, executive director of the Commission.

Aaron served four years with the Army Air Force in World War II. He is married and has two children.

Quail Season Forecast

Optimistic prognostications for a good quail season this fall continue to come in. The latest is from John Redd, new field biologist with the Commission of Game and Inland Fisheries, who says that the game wardens of Powhatan and Fluvanna counties are predicting fine quail hunting conditions. However, Chester F. Phelps, chief of the game division, warns that it is still too early to estimate final quail populations.

Thalhimer-Virginia Wild Life Project, Incorporated, Plans Nature Program at Maymont Park Here

Recently, twenty-two members of the Board of Directors of the Thalhimer-Virginia Wild Life Project, Inc., assembled at Maymont Park for their second annual meeting, at which time several amendments to the corporation's charter were adopted, and long-range plans formulated for the development of a nature study program to be introduced in Richmond.

The Thalhimer-Virginia Wild Life Project, Inc., was founded by a number of civic minded Richmond citizens, including leaders in business, industry, and state government. Among these are Irving May and

Adolph Rice Studio Photo

The Board of Directors of the Thalhimer-Virginia Wild Life Project, Inc., assemble at Maymount Park.

William B. Thalhimer, of Thalhimer's Store; Richard S. Reynolds, Jr., and Jesse A. Reynolds, of Reynolds Metals; A. W. Davenport, of Stone and Webster, Inc.; and I. T. Quinn, Executive Director of the Commission of Game and Inland Fisheries.

The purpose in forming an organization of this type was to stimulate public interest in Virginia wild life, conservation, and natural resources.

The corporation's principal interest and effort at the present time lies in the establishment and operation of an out-of-doors nature amphitheatre at Maymont Park. This project is planned to embrace a variety of unusual and interesting phases of nature exhibits and programs. It would include a nature museum, a year-round comprehensive study program of nature interpretation and education under a qualified naturalist, recreational programs, nature trails, wild life exhibits, and studies in natural resources.

Other action at the corporation's annual meeting was the nomination of officers to manage its affairs in the first year of its existence. They are: A. W. Davenport, president; Mrs. Enders Dickinson, III, vice president; Charles G. Thalhimer, vice president; Hilton J. Herrmann, treasurer; and Claire McCarthy, secretary.

Natural Resources Conservation Week

In a statement released from his office, Governor Stanley formally designated the week of October 14-20, 1956, as Virginia Natural Resources Week. Again, as during last year, state governing bodies, agricultural and conservation groups, all available media, and various civic-minded organizations will lend special emphasis to furthering the conservation of the Old Dominion's natural resources, and stress their importance to the general well being of the Commonwealth and to her people.

Education and inspirational programs have been suggested for county, state, and local participation.

According to Governor Stanley, conservation in the state has progressed appreciably during recent years.

Wildlife Questions and Answers

Ques.: **Is it lawful for the owner of a private pond to permit a friend who has no fishing license to fish in his pond?**

Ans.: It is within the law for a pond owner's guest to fish in a private pond without a fishing license.

Ques.: **I am a south Georgia catfisherman and wondered if you would give the record weights for catfish in your "Wildlife Questions and Answers" column.**

Ans.: World's record for the flathead or yellow catfish is 78 lbs. This fish was caught on November 25, 1955, in the Gaudalupe River, Texas. A channel cat weighing 55 lbs. was taken from James River in South Dakota in May of 1944.

The largest blue catfish weighed 102 lbs. and was taken out of Pickwick Dam, Tennessee, on June 11, 1955.

Ques.: **The mountain folks in Albemarle County say the yellow rattler is the female and the black rattler is the male. I say either one of them can be male or female. Will you please clear us up on this point?**

Ans.: The color of snakes is produced by minute bodies called chromotophores that are located in the scales. The melanophores produce the black and brown colors. The guanophores are responsible for the yellow and white shades. A rattlesnake, regardless of sex, may have an excess of either group of these color pigments, so you are right in that the color is not a factor in determining the sex of a rattlesnake.

Ques.: **Can foxes be attracted by calls?**

Ans.: Yes. There are several companies that manufacture fox callers. A practical method for calling this animal involves the imitation of a rabbit in distress. This is accomplished by sucking on the back of the hand. A little practice will be needed to create the desired sound.

Ques.: **When were the English sparrows and starlings introduced into the United States?**

Ans.: The English sparrow was first introduced in Brooklyn in 1851. A successful introduction of the starling was made in 1890 when 80 birds were released in Central Park, New York City.

Ques.: **An article in one of the outdoor magazines last summer told of squirrel hunters lost in the Dismal Swamp. It seems that they had no idea in which direction to travel in order to leave the area. If I remember correctly, a pocket or wrist watch can be used for finding direction. Can you refresh my memory on this subject?**

Ans.: You are correct in saying that a watch can be used as a compass. Hold the watch so that the face is pointing up. Place a stick at the tip of the hour hand. Then rotate the watch until the shadow cast by the stick falls along the hour hand. The hour hand is now pointing directly toward the sun. If the time of day is in the morning, south will lie halfway between the hour hand and 12, in a clockwise direction. If it is in the afternoon, south will lie halfway between the hour hand and 12, in a counterclockwise direction. Be careful if your watch is set for daylight saving time.

Ques.: **Do you by chance have any figures on the largest beaver trapped in this country?**

Ans.: A Mr. John Webster of Tie Siding, Wyoming, trapped a beaver in December 1938, weighing 115 pounds! Actually, a 60 pound beaver is considered large but occasionally an individual beaver will be found that is much larger.

Ques.: **Was market hunting the whole reason for the disappearance of the passenger pigeon?**

Ans.: No. The extermination of any species usually involves many factors. Man, with his efficient methods of killing, was probably the chief cause of the disappearance of this bird. Other factors that probably had a bearing on its disappearance are: 1) a low reproductive capacity, 2) destruction by man of large sections of forest land once used as nesting and feeding areas, and 3) the species was not capable of adapting itself to a changing environment.

Ques.: **Are there any figures available on the number of buffalo killed in this country during pioneer days?**

Ans.: Figures on the total number of buffalo killed in the United States are rather controversial. However, the Smithsonian Institution estimates that approximately 1,401,000 of these animals were killed during the single year of 1872. From 1872 through 1874, they figure that 5,370,000 of these animals were slaughtered.

Ques.: **I have a friend who traps during the winter months. On several occasions I have seen him skinning muskrats and invariably he throws away the meat. Isn't there some way this meat can be utilized?**

Ans.: Yes. If the scent glands of a muskrat are removed, the meat can be prepared in the same manner as rabbit and it is a delicacy. These two bluish glands lie under the skin on the belly between the hind legs.

Ques.: **I have heard many arguments about the grey squirrel migrating. Does this animal really migrate?**

Ans.: No. A true migratory species is one that returns to the breeding grounds each year. Squirrels often move in large numbers from one place to another but they seldom return. This type of movement is known as emigration

Ques.: **I have a tent that has been in use for several years. Recently on a weekend fishing trip, it developed several tiny leaks during a rain. Can you give me a cheap method of waterproofing the canvas?**

Ans.: One of the cheapest and best methods of waterproofing a tent requires only three items: one gallon of gasoline, one pound of paraffin, and a broom or brush. Melt the paraffin and stir into the gallon of gasoline. Spread your tent on the ground and paint this mixture on the fabric by using the broom. Let dry for several hours. Remove excess grease at the end of this time with a rag. Repeat the above process. After the second application, your tent should keep you dry for a long time.

Ques.: **Could you tell me something about the "water flea?"**

Ans.: This is a small crustacean found in all fresh water. It is very important in the food chain of a stream or pond. The Daphne, one of our more common water fleas, feeds primarily on the lesser green algae and diatoms. These little animals are then eaten by the young fish and therefore act as a link in the food chain of nature.

10th ANNUAL WILDLIFE Essay Contest

$1400.00 in PRIZES

One, H. S. Senior Grade, $400 College Conservation Scholarship

SUBJECT: Our Wildlife Resource—its value and wise use.

SPONSORED BY: The Virginia Division of the Izaak Walton League of America and the Virginia Commission of Game and Inland Fisheries.

APPROVED BY: Virginia State Board of Education.

ENDORSED BY: Virginia Resource Use Education Council and Resource Use Committee, Academy of Science.

DATE: OCTOBER 1, 1956, to FEBRUARY 28, 1957.

PRIZES

One senior grade, college scholarship	$ 400
Eight grand prize awards, $50 each, one for each grade, totaling	$ 400
Eight second prizes, $25 each, one for each grade, totaling	$ 200
Eight third prizes, $15 each, one for each grade, totaling	$ 120
Sixteen honorable mention prizes, $10 each, two for each grade, totaling	$ 160
Sixteen special mention prizes, $5 each, two for each grade, totaling	$ 80
One school prize	$ 40
Grand total	**$1,400**

There will be seven prizes in each of the eight competing grades. Scholarship winner, grand prize winners and winning school representatives will come to Richmond as guests of the sponsors to receive their awards. Others will be given awards in the schools.

Two hundred certificates of merit also will be awarded in addition to the money grand prizes.

CONTEST RULES

1. Students from all Virginia Schools, grades 5-12 inclusive, are eligible.
2. Essays must be submitted through the schools participating. Schools to be eligible must send in an official entry card provided for the purpose.
3. Each essay submitted must bear the following information in the upper right hand corner: name, sex, age, grade, address, school, county, teacher. All high school seniors should give the name of the college or university they would like to attend and the course of study they are most interested in following.
4. The essays preferably should have between 500-1000 words; however, any length essay will be considered for judging.
5. Grand prize awards ($50 awards only) cannot be given to winners two years in succession. Also, Commission employees and their families are not eligible.
6. Scholarship award good only in Virginia colleges and universities unless course work is not offered. Award to go to top high school senior winner or next alternate.
7. Award to school to be made on basis of quantity and quality of essays submitted.
8. Final judging will be done by a panel of three judges —one from each sponsoring organization and one from the State Board of Education. Teachers are urged to indicate their choice of best essays, but to send in *all* their essays.
9. All essays MUST be mailed first class prepaid, to the Commission of Game and Inland Fisheries, Box 1642, Richmond 13, Virginia. Essays must be mailed and postmarked not later than February 28, 1957.